Volume 94 Number 15

STEEL

Production • Processing • Distribution • Use

The Week in Perspective

SLOWLY being consumed by a holocaust of criticism from both employes and employers, the Wagner labor bill to all appearances is being groomed for a spirited interment. Charges of racketeering by unions, unfair partiality on the part of the national labor board and coercion of unsuspecting workers were hurled right and left at hearings on the bill in Washington last week. p. 10

PIG IRON PRODUCTION, daily rate, for March accelerated 15.5 *per cent over the February pace, seven more stacks going in blast. First quarter production of iron made the startling gain of* 147 *per cent over the same three months last year.* p. 14

DURABLE OR CAPITAL GOODS INDUSTRIES are recognized as needing stimulation, so government and NRA experts are seeking to concoct some form of "shot in the arm," probably in the nature of advanced government credit. p. 15

EXPORTS OF IRON AND STEEL for February declined from the tonnage shipped in January, but continued to exceed by a wide margin the total for the same month a year ago, reflecting improved world conditions. p. 52

PARTIAL COMPENSATION for a $3,000,000 higher monthly labor cost is sought by steelmakers in new price schedules, most of which are effective April 12, with increases ranging from $2 to $8 a ton. Frantic rush by consumers to contract under old prices may take some of the edge off anticipated benefits of raised prices to producers. p. 55

PICTURE, IF YOU CAN, an automobile instrument board with a handsome imitation grained wood finish being formed, punched and drilled, after the finish has been applied to the sheet steel, and without the slightest scratch on the finish. It can be done. p. 27

TWO BILLION OIL CANS, the product of 350,000 tons of tin plate, are estimated as being potential annual requirements of oil companies selling their product in sealed quart cans. Last year, fifty million quarts were merchandised in cans. p. 28

NEW BUILDINGS FOR OLD is the aim of a recent development in which sheet steel panels are mounted on the outer face of an old building to provide a new, strong, clean, colorful exterior. p. 31

STOCKS OF STEEL, the like of which have never been seen, are being built up in Detroit automotive plants, which are rushing to get in under the wire before higher prices must be paid. p. 18

HAND TRUCKS of one type or another are used in nearly every industrial plant. Their manufacture accounts for consumption of over 100 tons of steel yearly. p. 34

NEW STEEL HOUSE has radiant walls, unified air control for its seven rooms; requires 9 *tons of steel; has steel and rubber floors; costs about* $2500. p. 37

STEEL PRODUCTION RATE for last week was off a shade to 48 per cent of capacity, but the outlook continues strong. p. 13

NEW ERA IN TRANSPORTATION is here. On land, on sea and in the air the trend toward higher speed, less weight and lower cost per mile is evident. Introduction of high-strength stainless steel and successful methods for welding it has aided in changing concepts of transportation equipment. pp. 20, 23

FIELD ERECTION COSTS of a welded storage tank were cut by catch bolting the sections before welding. p. 28

PICKLING DEPARTMENTS will be interested in a sodium silicate cement, resistant to acids, quick setting and self hardening. p. 46

SEAMLESS TUBE MILL of recent design hot rolls the pierced billet over a long, solid bar in a continuous close-coupled rolling mill. Improved grain structure and lack of eccentricity in the product, and flexibility as to sizes and lengths rolled are features. p. 48

Employers and Employes Drive Nails in Wagner Bill Coffin

BARRING unexpected support from some new source or vigorous intervention on the part of President Roosevelt, the Wagner "labor disputes bill" is not likely to pass at this session of congress.

To date the administration has been careful to avoid any act which could be interpreted as positively supporting this drastic measure. General Johnson, at one time willing to testify before the senate hearing, probably will not do so.

After hearing the testimony of a score or more of proponents of the bill, the senate committee on education and labor on Thursday and Friday, heard the statements of employers and employes of the steel industry. Senator Walsh, of Massachusetts, presided, with Senators Davis, McCarran and Erickson sitting in on Thursday and Senators Erickson, Davis and Metcalf in attendance on Friday. Abstracts of the testimony of six employer representatives and several dozen employe spokesmen follow:

Arthur H. Young

Speaking before the senate committee, Arthur H. Young, newly-appointed vice president, United States Steel Corp., charged that the bill in its entirety is both vicious and undesirable because of its fundamental philosophy as to the certain and complete clash of interest as between employer and employe.

Mr. Young called attention to the fact that those appearing as proponents of the bill were; 16 labor union officials, 10 government officials having to do with labor problems, and six college professors. Not one, he pointed out, appeared as an employer or an employe.

Copies of the employe representation plans in effect at the 18 subsidiaries of the Steel corporation, were presented by Mr. Young, and the fundamental principles of these cited, at the conclusion of which he asked, "Is there anywhere in this, anything that smacks of coercion, intimidation or domination?" "But," he continued, "these acts, the ordinary, everyday intercourse between men and management who mutually respect each other, are, under the terms of this bill, made 'unfair labor practices,' for which I and my associates may be fined or imprisoned."

Ernest T. Weir

Ernest T. Weir, chairman, National Steel Corp., outlined the growth of the Weirton Steel Co. from its beginning in a farm-land district of West Virginia to its present status, under which it now employs 12,000 workmen. He traced the close relationship between management and employes, emphasized the company's liberal attitude in regard to wages and declared that 80 per cent of Weirton employes have no interest in labor organizations.

"The average employe joins a union only because he is told by union organizers that he will not have a job if the union wins, and that jobs will be allotted according to the numbers on the union membership cards. Many of them sign cards because of coercion and intimidation, and yet this present bill lays no restraint upon coercion or intimidation by labor unions.

"Senator Wagner has been quoted as saying that the purpose of this bill is to make employe representation plans illegal. In my opinion, employe representation plans can accomplish far more for the workers than any national union can accomplish.

"One of the methods proposed in the bill of making employe representation plans illegal is to forbid the employer from paying for the time of an employe representative spent in his committee work. . . The Weirton Steel Co. spent from July, 1933, to February, 1934, inclusive, a period of eight months, in the payment of employe representatives for time engaged on their work, approximately $12,600. During that time it had payrolls in those mills of approximately $12,000,000, so that the amount paid to these men for that time was a relatively insignificant figure.

"This compensation for lost time is payable to whomever is elected and therefore could have no effect upon the attitude of the representative toward the company. It cannot, therefore, be a means of favoritism and the only purpose of putting such a clause in this act is to attempt to exterminate the company union in favor of national unions.

"If our men had belonged to a national union during this period of eight months they would have paid in dues, without counting initiation fees, out of the pockets of the workmen instead of the company, approximately $150,000, none of which would have been subject to public accounting and a great part of which would have gone to national union offices. If, in seeking to protect my men from the domination and control of national unions I am a 'public enemy who ought to be pilloried,' as Mr. Green referred to me, then I am proud to be so regarded.

"I noted Mr. Green's remarks before your committee about starving families in Weirton, whom he alleged to be walking the streets because of my attitude toward labor. I took the trouble to obtain some figures from the federal unemployment agency and the CWA as to the unemployed in the district in which the town of Weirton is situated. The two agencies together reported 455 unemployed persons, 154 of these were employes of other companies and 67 of them young men who never had been employed. So there is left 234 who claim to have been former employes of the Weirton Steel Co. 123 of these left our employ before Sept. 1, 1933; some of these as long ago as 1916, leaving 111 employes not now employed who claim to have been employed by us prior to the strike. Twenty-two of these 111 have been re-employed since the figures were obtained, leaving 89, of whom 43 had less than eight months service with us, some of them as short a time as two days.

"All during the depression there has never been any starvation in Weirton and that community made it a point to handle its own relief and take care of those who might be in want. I defy Mr. Green or anyone else to prove that there is or has been starvation in Weirton.

"I also took the trouble to have the average daily earnings of Mr. Long, who appeared before you and referred to the Weirton case, computed. He averaged in 1933, for every day he worked, over $10 a day and had an average as high as $14 a day during 1928. Another of the union men who came down here to appear before you was paid for every day he worked this year an average of well over $17 a day. These men are not down here protesting against any mistreatment of labor by the Weirton Steel Co. They are here because they are paid officers and organizers of the union, which is trying to get about $250,000 a year in dues out of our employes."

Charles R. Hook

Supported by a message of goodwill and hopes of victory from spokesmen for his 10,500 employes, Charles R. Hook, president, American Rolling Mill Co., said: "What disturbs me most about this proposed legislation is that there is an apparent assumption that the interests of the employer and the employe are not mutual but antagonistic." Mr. Hook disputed this principle and placed in the record sworn statements of employes, as to how harmony had been promoted in his plants through employe representation.

He also stated that no more legislation was needed, and that the national recovery act gives all the protection required to safeguard the in-

terests of employes, if impartially administered.

J. M. Larkin

J. M. Larkin, vice president, Bethlehem Steel Co., in commenting on the bill, referred to the employe representation plan of his company in which 42,000 employes recently were eligible to vote, and which has been in operation for more than 15 years. He pointed out that it has provided a happy and successful working arrangement which the men and management have found mutually advantageous and satisfactory; adding that he was wholly opposed to any legislation which would destroy or adversely affect this plan.

Mr. Larkin continued, "We are opposed to any bill which would set up a restrictive, militant system in place of methods which have worked successfully. . . .for many years. The whole philosophy of this proposed legislation, based as it is upon the fomented dissatisfaction of a small area of our national industrial life, seems to me to be wrong. We feel that further legislation at this time is entirely unnecessary."

T. M. Girdler

T. M. Girdler, chairman and president, Republic Steel Corp., opposed the Wagner bill on the ground that it is designed to interfere with direct contact between management and employes and to destroy the friendly relations which now exist. "After reading the bill," declared Mr. Girdler, "I think its purpose is to unionize all industry and subject our plants to the domination of national labor unions. This would be a great calamity."

Mr. Girdler commented on the charge that employers have exercised undue influence in the selection of representatives. "This statement is not true as far as our company is concerned," he said. "Nominations were made by secret ballot and the vote on the nominees so chosen was conducted by secret ballot. The only part taken by the company was to furnish ballots, ballot boxes, supplies and places for the men to vote. The conduct of the election was entirely in the hands of the men. Since the election of these representatives this company has exercised no influence upon their action. Anyone who thinks that these representatives, chosen by secret ballot to represent their fellow workers, would be overawed in dealing with their foreman, superintendent or even the president of the company, certainly does not understand the independence of steel plant workers."

Mr. Girdler declared that "if the Wagner bill is a part of a new deal it is certainly not a part of a fair deal." He said that 'Senator Wagner may call this a bill 'to equalize the bargain power of employers and employes'; but I think it a bill to tie the hands of employers and turn industry over to the American Federation of Labor."

In conclusion, Mr. Girdler stated that Republic Steel Corp. employs about 34,000 employes. "If these men were forced into the union," he said, "and were subjected to a compulsory checkoff they would be compelled to contribute annually a total of something like $408,000 to the support of the union. This is a free country and none of us can justly object to the proper efforts of labor unions to promote the membership of their organizations by all fair methods. We do have a right, however, to object to legislation which attempts to force industry and employes against their will to unionize. . . The passage of the Wagner bill, with the consequent labor troubles that are sure to follow, will add an intolerable burden to this industry from which I think we may justly ask this to protect us."

STILL AN OPTIMIST! On sailing March 31 for a month abroad Charles M. Schwab, chairman of the Bethlehem Steel Corp., said: "I am just as optimistic about America as I ever was. . . . The ideas back of restoration of prosperity are new to us older men, yet we are willing to go along and do our part in effecting better times. . . . We steel people have just raised wages when we are not making money, which in itself indicates that we are doing everything we consistently can. . . . Business is better, and there are indications of still better business."

Frank Purnell

Frank Purnell, president, Youngstown Sheet & Tube Co., told the committee that the real object of any plan of industrial relationship between employes and employers should be to bring about a feeling of confidence and mutual respect, to allay suspicion, to guarantee freedom of action and to encourage hearty co-operation. The representation plan of the Youngstown company, adopted in 1918 and now affecting 16,000 workers, he said, is based upon conserving the mutual interests of both parties, employes and management, and any inflexible substitute which destroys this close relationship would be ineffective.

Charging that it is impossible to change over night basic principles in any line of endeavor, Mr. Purnell stated that to take such drastic measures as proposed in the bill would so completely upset relations between employer and employe that it would be very harmful to the purposes of the national recovery act.

Whiting Williams

"The Wagner bill would set back American industrial well being 15 years. The unchecked opportunity for advancement combined with the free competition between union leaders, workmen-representatives and employers has put all of them on their best behavior and has developed the highest degree of co-operation between the job given and the job taker. This co-operation has helped the nation to enjoy its share of world trade. . . .

"Legal warfare under the Wagner bill would end all that has characterized our industrial progress and would hinder activities in home and foreign markets. . .

"My opposition would be just as strong if the bill gave dominance to shop committees instead of national unions."

Employes

Five representatives of the Bethlehem Steel Co., who testified that by unanimous vote the employes whom they represented agreed to defray the expenses of the delegation to Washington, explained in detail the operation of the Bethlehem plan of employe representation. They voiced firm objections to many of the provisions of the bill. Six representatives of employes of the Bethlehem Shipbuilding Co. also appeared in protest to the bill. Following their appearance, eight delegates of the employes of the Youngstown Sheet & Tube Co., nine for the employes of the American Rolling Mill Co., three for those of the Wheeling Steel Corp., five for the Republic Steel Corp., six for the Weirton Steel Co., five for the Interlake Iron Corp., and 19 for the employes of subsidiary companies of the United States Steel Corp. voiced protests against the bill. All of these representatives pleaded for preservation of the principle of employe representation and urged the defeat of the bill.

One, two or three representatives from each group acted as spokesmen for their delegations. They presented

their cases clearly and decisively and made an excellent showing under cross examination.

At one stage of the hearing, Senator Walsh, presiding, stated to one witness: 'If Senator Wagner were here he would tell you some of your criticism is not justified."

The witness replied: "I wish he were here; I would like to talk to him myself." This and similar replies made a favorable impression upon the employes present.

Jack Larkin, representing Weirton employes, described the Weirton representation plan and declared that all through the controversy at Weirton, "union agitators were in direct touch with the national labor board and often received advance information as to what the labor board was going to do."

J. F. Madden, employe representative, tinplate department, Weirton Steel Co., thundered to his listeners:

"The Amalgamated association and the American Federation of Labor are rackets playing on the poor laboring man as a sucker. They play congress and the senate that they may further feather their nests for their own earthly lust. What does organized labor do with dues?"

Throughout the session on Friday, when the testimony of employes was heard, it was apparent that the delegates of employe representation organizations were deeply resentful of the attitude of the senators. The implications of some of the questions asked by Senator Walsh incensed the employes. The effect was a feeling of antagonism against senators generally, a feeling which undoubtedly will be taken home and reported to the employes whom these delegates represent. Inasmuch as these employes constitute about 90 per cent of the wage earners in industry the political significance of this reaction cannot be minimized.

Institute

FOLLOWING the 10 per cent raise in iron and steel wages April 1 which added approximately $3,000,000 a month to production costs, a sweeping advance in prices has been announced to become effective this week.

Briefly, sheets and strip have been increased $5 to $8 a ton; billets and slabs $3; sheet bars $4; plates, shapes and bars $3; sheet piling $3; plain wire $3; wire products $5 to $6; No. 24 long ternes $8; tin mill black plate plain $4; skelp $2.

The new prices on all the foregoing products become effective April 12, except long ternes, effective April 14; and sheet piling, April 16. Some companies filed their advances on semifinished steels to become effective April 10.

Tin plate has not been increased, but may be advanced later. The official price of standard rails, $36.37½ per ton expires April 15, but no announcement has been made regarding its continuance. It is expected that higher prices will be filed this week on concrete bars and pipe.

Pig iron has been advanced $1 a ton in some districts to become effective April 15. Connellsville furnace and foundry coke have been increased 35 cents a ton, effective immediately.

The steelmakers' point of view was expressed in an explanatory statement accompanying the Illinois Steel Co.'s notification of an increase in blooms, billets and slabs. It stated:

"The present quoted price of $26 has been in effect since July, 1932, no change having been made since that date. In the meantime, wage rates in all producing departments have been increased, including that effective April 1, 1934, by upwards of 35 per cent, and in addition the cost of many materials and supplies purchased and used in manufacture have likewise largely increased, such increases being from 20 to 40 per cent."

¶The American Iron and Steel institute reports the number of steel workers receiving hourly piece-work or tonnage wages in February was 365,305, compared with 355,292 in January.

Average hours per week per employe increased from 29.2 in January to 31.9 in February, while the average hourly wage increased from 58.3 cents to 58.7 cents, the highest rate since the steel code took effect.

Based on the February total of wages paid, which was $27,394,221 or $12.31 per ton of ingots produced, the 10 per cent wage increase made effective April 1 will add over $2,700,000 monthly to steel payrolls.

In the past week those companies which had not previously announced increases to wage earners and salaried employes in the lower brackets have done so.

Bessemer Medal for 1934 Awarded to King George V

THE council of the (British) Iron and Steel institute announces that his majesty King George V has been graciously pleased to accept the Bessemer gold medal of the institute for 1934. The King has been the patron of the Iron and Steel institute since his accession.

The Bessemer gold medal was founded in 1873 by the Sir (then Mr.) Henry Bessemer, discoverer of the Bessemer process of steelmaking and the second president of the Iron and Steel institute. It has been awarded annually since that date to distinguished benefactors of the industry and particularly for pre-eminent contributions toward the scientific and technical knowledge of iron and steel. In 1899 Queen Victoria, and in 1906, King Edward VII agreed to be recipients of this medal.

Labor

APRIL 30 has been fixed by the federal district court of Delaware for arguments on a rule to show cause why preliminary relief should not be granted in the government suit against the Weirton Steel Co.

On March 20 the department of justice asked an injunction to restrain Weirton from interfering in a workers election to choose employe representatives. Claiming an emergency, representatives of the department of justice sought a hearing April 10, but the arguments of Weirton counsel against so great a rush prevailed.

¶NRA Administrator Johnson March 29 announced settlement of the controversy between the Edward G. Budd Mfg. Co., Philadelphia, and its striking employes. The company agrees in 90 days to re-employ at least one striker for every two men hired and when laying off men to do so in line with provisions of the President's settlement of the threatened automobile strike.

¶National labor board has directed the St. Louis regional labor board to determine whether employes of the Laclede Steel Co., St. Louis, desire an election. The St. Louis board recently denied the petition of the Amalgamated Association of Iron, Steel and Tin Workers for an election, but the board at Washington believes the basis for this local decision to have been inadequate.

¶NRA Administrator Johnson last week traversed old ground when he issued an order directing code authorities to create industrial relations committees or boards for the adjustment of labor complaints and disputes. This reinstates a policy, quiescent for sometime, of having labor troubles settled within industries themselves.

In this connection, General Johnson will appoint a labor and a consumers' adviser to the administration member of code authorities from nominees submitted by the labor and consumers' advisory boards. These advisers, while not members of the authorities, will have free access to minutes of meetings and to have the right to appear before the authorities.

Organized labor, speaking through John P. Frey, secretary-treasurer of the metal trades department of the American Federation of Labor, is critical of code authority handling of labor matters.

¶Employes of B. F. Goodrich Co., Akron, O., and its subsidiaries, have

been placed under a retirement pension plan which employes pay a small weekly sum and the company makes up the remainder of the cost. Employes affected number 21,000, in plants in the United States and Canada.

Production

STEELMAKING operation declined 1 point to 48 per cent last week reductions at Detroit, Wheeling, Cleveland and Buffalo more than offsetting the slight rise at Youngstown and in eastern Pennsylvania, and a 13-point gain in New England. Pittsburgh and Chicago operations were unchanged. Pittsburgh is scheduled to advance 3 points to 39 per cent, and heavier specifications indicate a gain in the average rate this week.

Pittsburgh—Unchanged at 36 per cent last week, with indications pointing to an advance of 3 points to 39 per cent this week. Had a leading interest not curtailed its open-hearth rate last week this advance would have been effected then.

Another blast furnace has been blown in the past week. Jones & Laughlin Steel Corp. blew in another furnace at Aliquippa on April 1, its second in three weeks. For the district, 21 out of 60 steelworks blast furnaces now are operating, and individual rates are as follows: Carnegie Steel Co., 9 of 32; Jones & Laughlin Steel Corp., 5 of 11; Bethlehem Steel Co., at Johnstown, Pa., 4 of 7; and Pittsburgh Crucible Steel Co., at Midland, Pa., Pittsburgh Steel Co., at Monessen, Pa., and American Steel & Wire Co., at Donora, Pa., each 1 out of 2.

Bessemer Limestone & Cement Co., Bessemer, Pa., resumed operations at its Bessemer plant April 2, where schedules have not been in effect since last summer.

Wheeling—Declined 7 points last week to 62 per cent, with 24 out of 39 open hearths on, against 27 out of 39 in the week previous. Wheeling Steel Corp., Wheeling, W. Va., will begin operation in two of its bessemer converters at the Benwood works on April 9, and announces that eight sheet mills at its Whitaker works will be started April 9.

Birmingham—Unchanged at 52 per cent, although uncertainty is intimated for the near future. Supplemental orders are expected before April 15, but this is not definite. Rail making warrants active operation of five open-hearth furnaces.

Buffalo—Decline 2 points to 50 per cent last week, with 19 out of 38 open hearths on. No immediate change in output is contemplated.

Chicago—Held at 48½ per cent for the third week, with blast furnace schedules also unchanged. Pig iron production last month was the highest since August. A steady steelmaking rate is in prospect.

Central Eastern Seaboard—Up fractionally to 35 per cent last week, with no change in the number of open-hearths operating, but with slightly longer schedules prevailing at some plants.

Cleveland-Lorain—Down 5 points to 67 per cent, with Corrigan, McKinney Steel Co. operating 9 open hearths; Otis Steel Co., 6; and National Tube Co., Lorain, 11.

Detroit—Off 12 points to 88 per cent, one producer having eight open hearths on and another having seven. The Ford Motor Co. having lighted its second blast furnace stack, all four stacks in Detroit are now operating.

New England—Increased 13 points to 82 per cent last week, one works putting on all capacity and others remaining unchanged. This rate is expected to hold starting this week.

Youngstown—Advanced 1 point to 55 per cent last week, with the rate expected to show a narrow gain this week.

¶Official statistics by the American Iron and Steel institute on March open-hearth and bessemer steel ingot production places the total at 2,797,194 tons, or 103,600 tons a day. In February 2,213,569 tons were made, averaging 92,232 tons daily. In three months steel ingot production thus totals 7,007,660 tons or more than double the 2,961,735 tons produced in the same period of 1933. March operations averaged 47.81 per cent.

Details of steel and iron exports and imports will be found on page 52 of this issue of STEEL.

U. S. Steel Corp.

UNDER a barrage of questions NRA, Myron C. Taylor, chairman, United States Steel Corp., responded at the Corporation's annual meeting April 2:

"NRA has been a good thing for the Steel corporation up to this time. . . . Emphatically no, a permanent NRA would not be a good thing for the industry; I only say this because our experience has not been sufficiently long with it. . . What may transpire between now and May 31 (when the code expires) in respect to the code is just as much a mystery to me as it is to you. I believe, however, that the great industrial movement which has been carried on through NRA has been of service to the country. . . . We consider NRA had another aspect as well as that affecting wages and hours. It gave to industry the privilege, which for years industry had sought, not in violation of law but in a fair effort to stabilize industry and to rid industry of unsound practices. . . . NRA is an experiment of co-operative action in which one of the weakest elements is human nature."

To the charge of a stockholder that the Corporation's attitude toward codes was "spineless," Mr. Taylor entered a vigorous denial, more than 200 stockholders applauding him and his general remarks on the outlook for industry. Said Mr. Taylor, optimistically:

"Last year we thought we had turned the corner and could see ahead immediate signs of revival. Today we know we have."

Tracing the Corporation's policy of caring for employes through the dark-

Steel Ingot Production — 1933-34

96.57 Per Cent of Industry Reporting
Gross Tons

1933	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	885,743	109,000	994,743	1,030,075	26	39,618	18.23
Feb.	922,806	126,781	1,049,587	1,086,867	24	45,286	20.83
Mar.	784,168	94,509	878,677	909,886	27	33,699	15.50
3 Mos.	2,592,717	330,290	2,898,947	2,961,735	77	38,464	17.67
Apr.	1,180,893	135,217	1,316,110	1,362,856	25	54,514	25.08
May	1,716,482	216,841	1,933,323	2,001,991	27	74,148	34.11
June	2,211,657	296,765	2,508,422	2,597,517	26	99,904	45.96
July	2,738,083	355,836	3,093,919	3,203,810	25	128,152	58.95
Aug.	2,430,750	370,370	2,801,120	2,900,611	27	107,430	49.42
Sept.	1,991,225	242,016	2,233,241	2,312,562	26	88,944	40.92
Oct.	1,847,756	191,673	2,059,429	2,111,866	26	81,226	37.37
Nov.	1,331,091	156,939	1,488,030	1,540,882	26	59,265	27.26
Dec.	1,624,447	132,787	1,757,234	1,819,648	25	72,786	33.48
Total	19,665,101	2,428,734	22,093,835	22,878,571	310	73,801	33.95
1934		**98.10 Per Cent of Industry Reporting**					
Jan.	1,786,467	172,489	1,958,956	1,996,897	27	73,959	34.13
Feb.	1,995,638	175,873	2,171,511	2,213,569	24	92,232	42.57
Mar.	2,540,143	203,904	2,744,047	2,797,194	27	103,600	47.81
3 Mos.	6,322,248	552,266	6,874,514	7,007,660	78	89,842	41.46

Figures exclude crucible and electric ingots. All the operating percentages are based on 67,386,130 gross tons annual capacity as of Dec. 31, 1932.

est hours of the depression, Mr. Taylor declared there was no brighter page in the history of any company than the one which the Corporation wrote with respect to treatment of its employes. Today, the Corporation is employing 200,000 persons at an average of 29 hours a week, only 20,000 fewer than in 1929.

No bonuses have been paid since 1930, the $99,000 referred to by the federal trade commission as having been paid James A. Farrell, former president, in 1932, being "salary and retirement pay."

For the Corporation's financial showing in 1933 see STEEL for Feb. 5, p. 12, and March 19, p. 14.

¶Steel corporation directors, meeting April 3, voted not to make any offering of common stock to employes this year, the second omission since 1903, due to the unsettled stock market and labor conditions. All executive officers were re-elected.

¶Myron C. Taylor sailed Friday for a brief trip to Europe to study the foreign trade situation.

NRA

BRIEFS presented at public hearing of the iron and steel warehouse code, April 5, at which R. S. Alexander, deputy NRA administrator presided, were:

Everett D. Graff, Joseph T. Ryerson & Son Inc., functions and services of the warehouses; Maurice Congdon, Congdon & Carpenter, Providence, R. I., products embraced by the code, and reasons for omitting pipe, concrete bars, certain wire products and galvanized sheets, tin plate and terne plate—products for the most part covered by other codes; Robert C. Ross, Joseph T. Ryerson & Son Inc., spoke on labor provisions; Guy Bible on voting provisions of the code; Lester Brion,

(*Please turn to Page* 74)

MARCH IRON PRODUCTION

	No. in blast last day of month Mar.	Feb.	Total tonnage Merchant	Nonmerchant
Ohio	26	24	62,239	411,476
Penna.	28	26	44,828*	374,847*
Alabama	10	10	62,247*	72,278*
Illinois	7	6	24,456	96,193
New York	8	7	38,660	76,405
Colorado	1	1		
Indiana	6	5	581	242,532
Maryland	3	3		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tennessee	0	0		
Utah	1	1	.....	118,846
West Va.	3	3		
Michigan	3	3		
Minnesota	0	0		
Missouri	0	0		
Total	97	90	233,011*	1,392,577*

*Includes ferro and spiegeleisen.

March Iron Output Gains 15.5 Per Cent; 97 Stacks Active

REGISTERING another substantial gain, production of coke pig iron in the United States in March moved to the highest level since last August and marked the fourth successive month to record improvement. The average daily rate increased 15.5 per cent and operating blast furnaces moved from 90 at the close of February to 97 at the end of March, the highest point in seven months.

AVERAGE DAILY PRODUCTION

	1934	1933	1932	1931
Jan.	39,537	18,348	31,336	55,337
Feb.	45,385	19,752	33,122	61,114
Mar.	52,438	17,484	31,194	65,448
Apr.	.....	20,786	28,524	66,986
May	.....	28,784	25,282	64,355
June	.....	42,165	20,867	54,599
July	.....	58,108	18,394	47,170
Aug.	.....	59,137	17,035	41,264
Sept	.....	50,264	19,788	38,947
Oct.	.....	43,824	20,795	37,831
Nov.	.....	36,124	20,858	36,727
Dec.	.....	38,456	17,650	31,625
Av.	45,800	36,223	23,699	50,035

Average daily output of March was 52,438 gross tons, a gain of 7053 tons over the 45,385 tons of the preceding month. The rate for last August was 59,137 tons. This was the best showing for any March since 1931 when 65,448 tons was produced. In March, one year ago, production was only 17,484 tons; in 1932 it was 31,194 tons.

Total production in March was 1,625,588 gross tons, which compared with the 1,270,792 tons of February, was an increase of 354,796 tons, or 27.8 per cent. March, however, was a 3-day longer month than February. This output was the best since last August when 1,833,265 tons of iron was made; and the best March since 1931 with 2,028,906 tons. Production amounted to only 542,013 tons in March, 1933.

RATE OF OPERATIONS

(Relation of Production to Capacity)

	1934[1]	1933[1]	1932[2]	1931[3]
Jan.	28.7	13.3	22.1	38.4
Feb.	32.9	14.3	23.4	42.5
Mar.	38.0	12.7	22.0	45.4
Apr.	.....	15.1	20.2	46.5
May	.....	20.9	17.9	44.7
June	.....	30.6	14.7	37.9
July	.....	42.2	13.0	32.7
Aug.	.....	42.8	12.0	28.7
Sept.	.....	36.4	14.0	27.0
Oct.	.....	31.8	14.7	26.3
Nov.	.....	26.2	14.7	25.5
Dec.	.....	27.9	12.5	22.0

[1]Based on capacity of 50,313,975 gross tons, Dec. 31, 1932; [2]on capacity of 51,598,175 tons; [3]on capacity of 52,515,875 tons. Capacities by American Iron and Steel institute.

The first quarter output exceeded the 1933 first quarter by 147 per cent. Production for the three months of this year aggregated 4,122,023 tons, against 1,663,865 tons in the corresponding period of last year, the increase being 2,458,158 tons. In the first quarter of 1931, the total was 5,455,541 tons.

The 97 operating blast furnaces on March 31 was the highest since last August, when 98 were active. At the close of March, one year ago, only 38 were in production. During the month, 9 stacks were blown in and 2 were blown out or banked, making a gain of 7 over the 90 active on Feb. 28. Of the nonmerchant or steelworks class, 7 were blown in and 1 was blown out. Of the merchant class, 2 were blown in and 1 blown out.

Relating production to capacity, the operating rate for March was 38.0 per cent, as compared with 32.9 per cent in February and 28.7 per cent in January. The March rate was the highest since last August with 42.8 per cent. One year ago the operating rate was only 12.7 per cent.

MONTHLY IRON PRODUCTION

	1934	1933	1932
Jan.	1,225,643	568,785	971,437
Feb.	1,270,792	553,067	960,550
Mar.	1,625,588	542,013	967,015
Total 3 mo.	4,122,023	1,663,865	2,899,002
Apr.	.....	623,606	855,734
May	.....	892,326	783,769
June	.....	1,264,953	626,015
July	.....	1,801,345	570,222
Aug.	.....	1,833,265	528,105
Sept.	.....	1,507,931	593,640
Oct.	.....	1,358,540	644,648
Nov.	.....	1,083,740	625,753
Dec.	.....	1,192,136	547,179
Total	.....	13,221,707	8,674,067

Furnaces resuming in March were: In Ohio; Portsmouth and Steubenville No. 2, Wheeling Steel Corp. In Pennsylvania: One Aliquippa, Jones & Laughlin Steel Corp.; Cambria F and G, Bethlehem Steel Co.; Neville Island, Davison Coke & Iron Co. In New York; Lackawanna G, Bethlehem Steel Co. In Illinois: One Federal, Interlake Iron Corp. In Indiana: Gary No. 9, Illinois Steel Co.

Stacks blown out or banked were: In Pennsylvania: National No. 2, National Tube Co.; Sheridan No. 2, Lavino Furnace Co.

WINDOWS OF WASHINGTON

Cherries, Business Blossom

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Johnson Upholds Steel Code

• • •

Navy Will Stock Stainless

WASHINGTON

WITH its famed cherry blossoms again about to burgeon into life, Washington unmistakably reflects a more cheerful and optimistic mood than at any time in the past two to three years. The capitol is tremendously reassured by encouraging reports from industrial leaders that business really is on the upgrade.

Its mind possibly less on the cherry blossoms of this spring than on the elections of next fall, congress reflects a much milder mood. Over-riding of the President's veto of the independent offices appropriations bill appears to have marked the height of the recent legislative ferocity. Its mood may be different next week, or the week after, but for the moment congress reflects a chastened spirit.

Now that a business revival seems imminent, there is a growing feeling in congress that it will be wise to cease baiting business and industry. Some prominent members of congress have expressed the belief that it would be well to shelve the Wagner bill, the securities bill and other legislation of this character and adjourn by May 15, so that business men may go ahead with confidence.

STEEL'S code of fair competition seems destined for the issue on which the duel between the Old Deal and the New Deal will be fought out. General Johnson, looking fitter than usual and utterly unaffected by the spring atmosphere, has accepted as a gage of battle the federal trade commission's report on steel prices. The general announced on Tuesday that he was going to reply to this report.

Declaring that he is not entirely satisfied with the steel code, General Johnson nevertheless characterized it as the product of an improved school of thought. The code, he said, is experimental. Observation of the effects of its administration, he said, will point the way to the future. What is good will be continued; what is bad will be eliminated. The old system of the federal trade commission, he said, "took us to hell." It is on this basis that the General proposes to fight for the steel code and all the others for which it is the symbol.

General Johnson also said that rather than reopen the NIRA to a flood of amendments he would be satisfied to let the licensing provision expire in June.

More than ever General Johnson looms up as the adminisration's strong man. In the near future will be transferred to him, as NRA administrator, the direction of the administration's plans for stimulating home construction and for activating the durable goods industries. These plans, under formulation by Frank C. Walker, director of the national emergency council, and Winfield W. Riefler, central co-ordinating statistician of the administration, in conference with representatives of practically all departments of the government, are nearing conclusion. They are based on a growing belief that for further recovery a "push" in building construction and the so-called durable goods industries is absolutely needed. So important is the Walker-Riefler plan of co-ordination considered that the business advisory planning council, comprised of 56 heads of all principal administration divisions, has appointed a special subcommittee to investigate this subject and report on it in detail May 4. The plan is understood to include full provisions for advancing credit to durable goods manufacturers.

The administration is gratified with the many wages increases—usually 10 per cent—which have been announced by various industries during the past two weeks. Only in a few cases, however, have working hours been reduced. However, it may be said authoritatively that the administration is not satisfied; it definitely demands that more men be put to work. NRA has launched a canvass of all major industries to determine what can be done in putting more men to work by shortening hours, and negative answers by industries will require tall explaining.

THE navy has established a new policy in regard to purchases of stainless steel. To obtain the benefit of carload freight rates, and to avoid quantity extras, stainless steel hereafter is to be bought in large lots, and stocks will be carried at the various navy yards. The first opening of this kind occurred on April 3, in connection with Schedule 2007, involving about 500 tons of stainless sheets, plates, strip, angles and bars for a number of yards.

Identical steel bids submitted under the NRA steel code are not very popular with government purchasing departments. It took nearly an entire day, with eight people working, to conduct a recent important opening—and the result was that all bids were identical to the last decimal of a cent. Awards are to be determined by pulling blank and loaded capsules out of a box. In one department the suggestion has been considered that drawings be made in advance in order to determine beforehand what steel companies should submit bids.

Opening gun in the fight of industry against the Wagner-Lewis unemployment insurance bill as now written has been fired by the national automobile chamber of commerce. Industry objects to the 5 per cent tax which would be imposed on payrolls. It holds that employers should be exempt from this tax in states where unemployment insurance acts are in effect. It desires provisions for the segregation of the amounts realized by the tax so that the tax raised in a particular state will be used solely for the payment

(*Please turn to Page* 75)

Industrial Men in the Day's News

W. F. Detwiler, Executive Vice President and Director, Allegheny Steel Co.

For over a quarter century he has been active in various departments of this important steel company.

At an early age he served a 10-year electrical apprenticeship with a Pittsburgh manufacturer.

His work was recognized further in his appointment as a director of the iron and steel institute recently.

W. F. DETWILER, who as announced in STEEL for March 26 has been named executive vice president and elected to the board of directors of Allegheny Steel Co., Brackenridge, Pa., is an executive yet young in years, but with 26 years of continuous experience with the Allegheny company.

Prior to his association with the Allegheny company in 1908, he served a 10-year electrical apprenticeship with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., starting out when about 17 at a wage rate of 4c per hour. At the end of this period he was rewarded for his efforts by receipt of $100 in gold coin.

His first job with Allegheny was as master mechanic, later assistant superintendent and finally general superintendent. He was advanced to assistant manager and then vice president and general manager, the position he held before his recent promotion.

Born in Bedford county, Pennsylvania, Mr. Detwiler is a resident of Pittsburgh. He was recently named a director of the American Iron and Steel institute, of which he has long been a member.

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Batt L. Spain, for the past 24 years manager of turboblower sales at the West Lynn, Mass., works of the General Electric Co., is now manager of the turboblower department of the Ingersoll-Rand Co., Phillipsburg, N. J., and will be located at the company's general offices, 11 Broadway, New York. Occasion for the transfer is the acquisition of General Electric turboblower business by Ingersoll-Rand.

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Donald R. Dohner, formerly director of art in the engineering department of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Alexander J. Kostellow, professor of industrial design, Carnegie Institute of Technology, Pittsburgh, have established offices at 99 Vandergrift building, Pittsburgh, where they will manage an industrial design and research service.

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F. A. Lorenz Jr., general manager in charge of sales and production for both the Indiana Harbor, Ind., and Pittsburgh plants of American Steel Foundries, Chicago, has been appointed vice president of the company.

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Paul N. Anderson has been elected president of the Dahlstrom Metallic Door Co., Jamestown, N. Y. Serving with him on the board of directors will be Oscar E. Anderson, C. F. Emerson, Clyde L. Carnahan, Oscar A. Lenna, Wycliffe L. Clark and Marvin L. Peterson.

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William F. Sailer, formerly with Alco Products Inc., and the Griscom-Russell Co., is now associated with Steel and Tubes Inc., Cleveland, to be located in the Brooklyn, N. Y., office, covering the oil refinery and marine fields.

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J. A. Bouslough has been appointed sales representative in the Pittsburgh district for the Sheffield Machine & Tool Co., Dayton, O., with offices at 606 North avenue, Wilkinsburg, Pa.

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F. F. Shortsleeve, identified with the foundry supply business for the past 15 years and prior to that time an active foundryman, has established his own business in Elmira, N. Y., as foundry supply agent to handle all foundry materials with the exception of metals and fuels.

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H. S. Stassen, purchasing agent of the Checker Cab Mfg. Corp., Kalamazoo, Mich., has resigned effective May 1.

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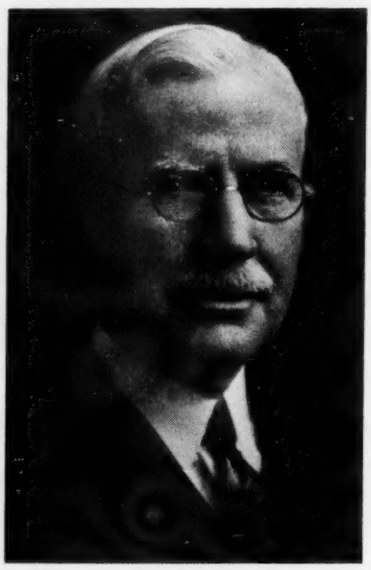
Charles E. Conley, identified with the Chicago sales office of the Jones & Laughlin Steel Corp., Pittsburgh, recently was honored by members of the Chicago organization at a banquet tendered him in observance of his completion of 50 years of sales work with this company at Chicago. Possessing a record of service unique in the steel industry, Mr. Conley dates his earliest sales experience to a period when steel as a material practically was unknown and when iron was the product offered by mills of the country. He joined Jones & Laughlin Ltd. at Chicago on March



Charles E. Conley

24, 1884. His first duties were as bill clerk, later being placed in charge of the city office, with general supervision over sales, shipping and billing. This position he held for 30 years. One of the best known and most active steel salesmen in the Chicago district, Mr. Conley now specializes in the development of railroad sales there for his company.

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B. B. Weinberg, formerly a director and vice president in charge of

sales of the Heppenstall Co., Pittsburgh, and vice president and treasurer of the Heppenstall Razor Co., Newark, N. J., resigned April 1, to become vice president and treasurer of the American Shear Knife Co., Homestead, Pa., manufacturer of alloy steel shear knives and high-grade steel mill forgings. He was connected with the Heppenstall company for over 18 years, serving in the various capacities of clerk, production manager, general superintendent, and general sales manager.

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William W. Coleman, president of the Bucyrus-Erie Co., South Milwaukee, Wis., sailed for Europe April 5.

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Col. Harry Scullin, president of the Scullin Steel Co., St. Louis, has been appointed excise commissioner for St. Louis.

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James F. Knowlson, president, Speedway Mfg. Co., Cicero, Ill., has been elected a director of the Stewart-Warner Corp., Chicago.

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Homer L. Mueller has been appointed vice president and general sales manager of the Cleveland Welding Co., Cleveland, succeeding Carl S. Holden.

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George A. Pugh, formerly vice president of the Aetna-Standard Engineering Co., Youngstown, O., sailed April 1 for a short business trip to England and continental Europe.

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Edward N. Gosselin continues as president of the Graver Tank & Mfg. Corp., East Chicago, Ind., and the Phoenix Mfg. Co. A previous statement that apeared in this column was erroneous.

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Edward A. Bodine, advertising manager, Acheson Oildag Co., Port Huron, Mich., has transferred his office from New York to Port Huron. Technical department of the company will continue to be in New York.

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John C. Scheeler, president, Buffalo Wire Works Co., Buffalo, has been elected to the board of governors of the Organization Service Corp., co-operating with the Fabricated Metal Wire Products Corp. on code problems for the wire products industry.

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David Adams has been appointed Pittsburgh district sales manager of the Falk Corp., Milwaukee, succeeding W. O. Beyer, who recently resigned to become a member of the Pittsburgh civil service commission. Mr. Adams has been with the Falk Corp. for the past four years in the sales department at Milwaukee, and previously was associated with National Malleable & Steel Castings Co., Sharon, Pa., and W. A. Riddell Co., Bucyrus, O., in charge of foundry and sales.

Died:

DR. WALTER ROSENHAIN, 58, consulting metallurgist, and fellow and past president of the Institute of Metals, London, at his home in Kingston Hill, Surrey, England, March 17. Educated in Melbourne, Australia, he graduated in 1897 from the University of Melbourne in physics and engineering. He then went to England as holder of a research scholarship and spent three years at Cambridge university, later taking up the microscopic examination of metals. In 1901 he became scientific adviser to Chance Brothers, Birmingham, glass manufacturers, and in 1908 was appointed first superintendent of the department of metallurgy and metal-

Dr. Walter Rosenhain

lurgical chemistry at the National Physical Laboratory, a post which he held for 23 years until his resignation in 1931, when he took up consulting metallurgical work. He was widely known in metallurgical circles for his theories in regard to "slip bands" in metal microstructures and the phenomenon of recrystallization in soft metals at room temperature.

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Albert W. Shafer, superintendent, Fort Pitt Spring Co., McKees Rocks, Pa., in Pittsburgh recently.

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Arthur W. Kettle, 65, one of the organizers of the Gurney Ball Bearing Co., Jamestown, N. Y., in that city, March 30.

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Jacob Cambier, 67, formerly an official of the Colorado Fuel & Iron Co., Denver, in Los Angeles, March 26. He retired in 1918.

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Dr. Thomas B. Brighton, 47, professor of metallurgy at the University of Utah, in Salt Lake City, Utah, recently. He was a member of the American Institute of Mining and Metallurgical Engineers.

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William C. Cadwallader, 48, works manager of the Eastern Steel Castings Co., Newark, N. J., in that city, April 1.

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Mrs. Elbert H. Gary, widow of Judge E. H. Gary, long chairman of the board of the United States Steel Corp., at her home in New York, April 5.

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Pascal P. Beals, 83, for many years a leader in the manufacturing and wholesale distribution of iron, steel and heavy hardware in the Buffalo district, at his home in Buffalo, April 3. He retired from Beals, McCarthy & Rogers about 20 years ago.

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George W. Llewellyn, 40, for many years president of the Llewellyn Steel Co., Detroit, jobber of sheets, and at the time of his death identified with the Border Cities Trucking Co., in Port Clinton, O., April 1.

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Edward W. Jones, 45, vice president and general manager of the Laclede Stoker Co., St. Louis, in that city, March 24. In 1919 he was chief engineer of the Laclede-Christy Clay Products Co. and in 1924 purchased the stoker rights of this company.

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George H. Hansel, 78, for many years vice president and treasurer of the Combustion Engineering Corp., New York, in Summerville, N. C., while returning from Florida. He retired last August.

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James Lyman, prominent engineer, in Del Monte, Calif., March 28. For a number of years he was associated with the General Electric Co., at one time being engineer in charge of the western district at Chicago.

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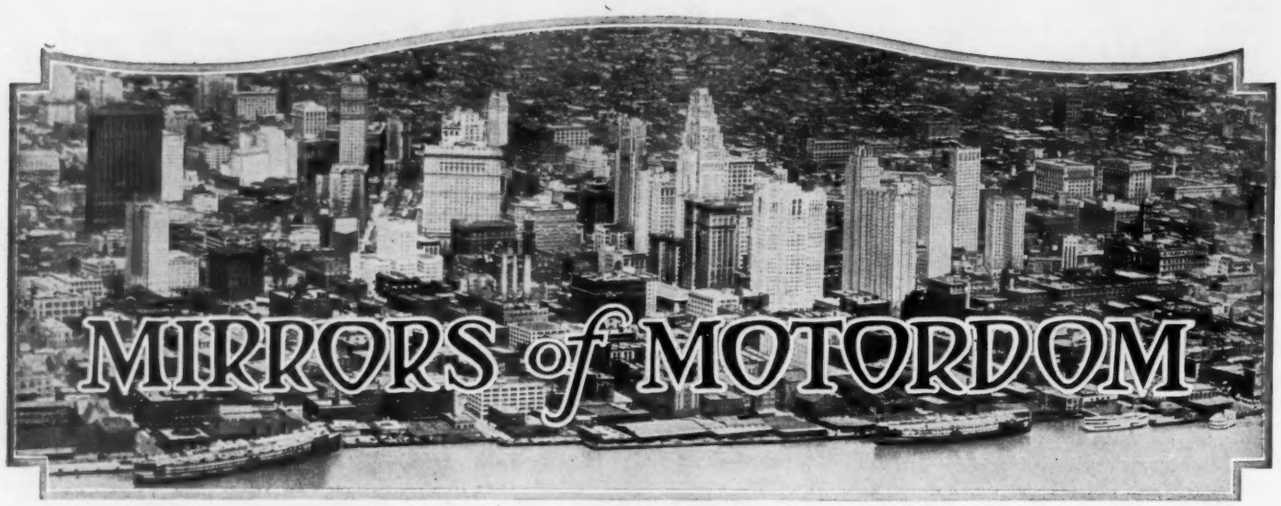
George F. Alderdice, 58, president of the Commercial Shearing & Stamping Co., Youngstown, O., and vice president of the Brier Hill Steel Co. before its absorption by the Youngstown Sheet & Tube Co., at a hospital in Youngstown, April 5. As a youth he first worked in the mechanical department of the Carnegie Steel Co.'s Upper Union mills, then in the operating department of the Park Steel Co., and later in the company's general offices. When Crucible Steel Co. absorbed Park Steel, he was named assistant to the general auditor and eventually general sales manager. In 1910, he became connected with the former Republic Iron & Steel Co. as assistant to the vice president at Pittsburgh, later district sales manager at St. Louis, and then assistant general manager of sales. In 1915 he went with Brier Hill Steel as assistant to the president, shortly afterward being first vice president.



Build Up Steel Inventories

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April Schedules Are Higher

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Big 3 Make 85% of Autos

DETROIT

JUST as certain as this is April and the year is 1934, the automotive industry is bent on accumulating another heavy inventory of steel.

Last December's huge piles of sheets and strip in warehouse, bin and on wharf here are rapidly being depleted, yet Detroit last week received the news of higher steel prices with a mixture of expectancy and antagonism.

The automobile industry was not at a loss for what to do. It immediately took up another notch in its belt and decided on three policies.

The first was to get under cover on steel. The second was to raise prices on new cars—effective immediately with announcement. Chrysler Corp. and Studebaker broke the ice on price advances April 3 but not far in the rear the next day was General Motors with step-ups ranging from $20 to $300 per car.

The third play the industry made was to negotiate its steel contracts in much the heaviest volume in many quarters, with a view to taking out every ton ordered. Steel users—and this runs the gamut of all of motordom's plants—decided last week to lay in even more steel than the 30,000 tons that were stocked up in every available nook and cranny last December, just before the Jan. 1 steel price advance applied.

Because the present steel schedule advance is wider—though few automotive purchasing agents seemed last week to realize it does not restore either 1929 or 1926 steel prices—before another 60 days have passed, warehouse space in Detroit should be at a premium.

The automobile industry seems determined that higher steel costs will not be reflected in their manufacturing costs until 1935. Yet, automobiles are raised instantly in price—to compensate for higher wage rates in part, it is true, but shrewd observers here feel it is a backhanded slap of some force directed at steel.

This is the way events of the next two or three months are likely to shape up:

Steel users—the motor plants plus their vast entourage of parts' suppliers the country over—are now completing contract coverage in steel, or at least they will have by around April 15. This coverage, so reliable estimate has it, is aggregating well over 500,000 tons of various rolled steel, mainly flat-rolled items. Releases against these obligations will increase by weeks through late April and all of May, but as June progresses more steel will go into inventories than into automobiles. June will be a frenzy like last December, when steel contracts had to be completely shipped.

In a normal year, July might open with steel and other supply interests dropping into a pocket, both because of the seasonal letdown and the heavy inventories. But Detroit has a secret sense that tells it 1934 will be different; that if labor difficulties in industry generally have been smoothed out, coupled with generally higher wages, retail demand may just be opening up. July is too far ahead for any definite schedules, but the hangover of steel into the third and fourth quarters may be less than might normally be expected.

Automobile consumers have learned much in the past few months on the technique of storing steel, and they also approach the months when climatic conditions will be more favorable.

WHETHER this increase in the price of automobiles will ultimately react in 1935 to pare down retail volume, or whether general business on the outside will be sufficiently revived to give purchasing power the strength to absorb it, is a moot point.

For the time being, the automobile industry is confident that the retail market still is on the upgrade. Judging from April schedules, which should eclipse any month of the first quarter and almost double last April, the industry is backing up its judgment.

Chevrolet, leader at the writing, made 110,266 cars in March and will make slightly more than that number in April. Assemblies at this General Motors division are actually closer to 200 per hour, 24 hours a day, than the rated capacity of the company—180 per hour.

This rate adds up to 5000 units per day, and, counting a heavy play to be made on commercial cars this month, Chevrolet no doubt will account for 120,000 automobiles. Incidentally, March was the highest Chevrolet production month in the past 34 months, the fourth best in the company's history. First quarter output was 223,010 units; a year ago, 148,336.

After all, the second Chevrolet line which already is in dealers' hands but will not be formally announced until April 14, will be called the standard. There was some agitation for avoiding the term standard for fear the use of semi-elliptic spring and an I-beam front axle on this model might lead to the supposition that knee-action springs on the master models were something special.

These standard models feature a wider frame, with springs mounted farther apart and parallel to the wheels instead of to the converging lines of the frame; the front tread is 2 inches wider, now being 56 inches; there are three horizontal louvers in the hood; the valance on the front fender is deeper and the overhang of the fender in front is longer; the side rails of the frame flare out at the front; cables are used for the

front brakes; bore and stroke are unchanged.

Ford, in second place, hovers between 3700 and 4000 jobs daily and is stocking some cars in various sections, but not disproportionately, so that retail deliveries are much easier to promise. The second Fordson blast furnace was blown in last week, it being a matter of years since both stacks were in there at the same time.

Detroit should have known that Henry Ford's co-operation in putting up wages to quell labor trouble was too good to be true. In refusing to put up prices—in fact, going farther by attacking manufacturers who have advanced—he is playing his trump card in trying to regain leadership in the low-price field.

Chevrolet and Plymouth, both of which have increased their f.o.b. prices, know, however, that in a rising market increases are far less of a deterrent to clinching orders than when the market is easing off. Rising steel prices, incidentally, will tend to stiffen Mr. Ford's resolve to go through with plans for making more of his own steel. A continuous strip-sheet mill has been ordered, but some auxiliary and semifinishing equipment has been in abeyance.

PLYMOUTH, like Chevrolet but unlike Ford in this respect, is just beginning to feel its 1934 oats. Emerging from the complications of shop difficulties, mechanical problems and time and again disrupted production because of failure of outside parts' suppliers to correlate, Plymouth shipments lately have been topping 9000 cars weekly.

Dodge has steadied now for three weeks at close to an average of 800 assemblies daily. Chrysler and DeSoto are trying hard to get airflow shipments up to 400 daily. All Chrysler divisions shipped 85,157 cars in March, against only 19,996 last March. Chrysler's first quarter totaled 167,842 units; a year ago 58,347.

Buick, after assembling 6943 cars in March, has scheduled 8746 for April, but a large share of this month's output will be the new small model, expected to be announced late in April or early in May. The trend on the regular line seems to be down, and the night shift was recently taken off.

Pontiac has scheduled 18,600 units for April, compared with an actual total of 14,891 in March, making the highest rate since 1929. There is, however, just a shade of disappointment in the Pontiac showing this year. Pontiac's position is being compared with that of DeSoto, which in 1932 gave Plymouth a tussle for leadership in Chrysler production, then slipped down the following year.

Olds is just emerging from a series of shop and personnel complications that permitted anything but smooth production. Consequently, production at this division is on the up side. Several important personnel changes were made last week not only at Olds but also in Chevrolet's Flint division.

Packard shows signs of undoubtedly holding back its low-priced car until the fall. The existence of plans for this car was recently confirmed by President Macauley, but definite details are not available. It seems reasonable to suppose that the small Packard will fall in the class beneath $1000, but some contend that it may be dropped into the hotly-contested LaSalle field of around $1500. Whether Packard will go to a V-type eight in the small car is not confirmed; some believe a small V-8 will be used.

Hupp's recent reopening of the Cleveland body plant was to accommodate body production on a lot of 15,000 "juniors." Pierce-Arrow is about to radically cut the price of its eight partly through a slice in list price plus a contribution through a cut in dealers' commissions.

LaSalle production is mounting to close to the goal set of 100 assemblies daily, but as is true in so many other cases here, parts suppliers have been the causes of some delays. Cadillac production is drooping and is no better than 25 units daily.

Graham has scheduled 3000 units for April, an increase of about 200 over actual March production. Unfilled orders on April 1 were almost 1500.

Willys-Overland, which last week began assembling the 5000 small jobs sanctioned by the court, is likely to petition for permission to make even more, and the receivers have hopes that the market will be brisk enough this year to permit it to pull out of the hole. Willys and Studebaker are the only major receiverships in the industry, and the outlook for both is improving.

Hudson's last report on weekly shipments shows 5023 cars having been delivered, this rate surpassing the 4090 dispatched the last week of March and being the best Hudson week since late February, 1930. Hudson's third assembly line now is running and that maker, with 21,000 assemblies on the April schedule, should account for a large share of the independents' April output.

Incidentally, observers think that General Motors, Ford and Chrysler this month will account for fully 85 per cent of all cars produced. This would leave only some 45,000 for the so-called "independents," and Hudson should make close to half that total.

WHILE the automobile labor tribunal hied itself to Racine, Wis., last week on its first case to listen to the grievances attendant to the Nash strike, Alfred P. Sloan Jr., president of General Motors, struck a pessimistic note in his letter to stockholders which accompanied the General Motors' annual report.

Evidently Mr. Sloan was not entirely agreeable with the settlement arrived at in the automobile labor threat, for he repeated that "the labor provisions of section 7-A to the NRA must be clarified, or there is certainty of an industrial strife, the equal of which the country has not yet seen, and just at a time when there is foundation for hope of recovery."

Presumably, Mr. Sloan echoed the true sentiments of all the automobile industry. It is interesting to note, though, relative to Dr. Leo Wolman's appointment as the neutral on the automobile labor board, that after all he must be a neutral for both sides—automobile and labor organizer alike—seem to be against him. There could be no better qualification for a neutral.

But, to return to Mr. Sloan's utterances. He hit straight from the shoulder when he came out flatly against the 30-hour week stating, that "the average hours of employment over a decade may be gradually reduced, but from an economic standpoint an immediate radical adjustment is bound to exert a highly deflationary influence and at a time of improving conditions will surely inject into the picture an objectionable effect."

LAKE shipping is expected to get under way this week, at least for the lower lake ports. Several shipments of scrap are destined to leave Detroit if all goes well. Speaking of scrap, production at Detroit has been so heavy in some cases that plants have been unable to bale the day-to-day make. . . . On April 3 a petition in bankruptcy was filed voluntarily by Franklin at Utica, N. Y., with no statement as to assets or liabilities. . . . The Durant plant at Lansing, Mich., is understood being prepared for activity under its new ownership. . . . A prominent independent car maker is reported having contracted with Continental Motors to run off some 2600 of the latter's unfilled orders. Chrysler is expected to take over more of the Continental floor space.

Russia Lights 110th Stack

Soviet Russia's 110th blast furnace was blown in Jan. 17 when the third stack at the Kuznetsk plant in Siberia was lighted. The first two stacks at Kuznetsk were built under supervision of the Freyn Engineering Co., Chicago. The fourth stack at the Magnitogorsk plant in the Urals was completed Dec. 31.

EDITORIAL

Next Step in Progress of Transportation Is Near

TRANSPORTATION is much more important to the iron, steel and metalworking industries than is generally realized. The service of moving passengers and goods to meet the needs of 120,000,000 individuals requires a far greater percentage of the products of industry than any other single activity.

Last year 40 per cent or more of the national output of finished steel went into transportation structures and equipment. STEEL's annual compilation of the consumption of finished rolled steel (Page 98, Jan. 1, 1934) showed the following distribution to transportation:

	Percentage of Total Output
Railroad cars and locomotives	3.20
Railroad track, buildings and bridges	4.84
Highways and highway bridges	2.38
Automotive	20.95
Shipbuilding	.65
Oil, gas and water: Of total of 4.88 per cent, percentage for "transportation" is estimated at	3.50
Jobbers: Of 14.91 per cent sold through jobbers, percentage for "transportation" is estimated at	4.50
Total	40.02

The total may be considered conservative, inasmuch as a portion of steel distribution credited to "machinery, tools and equipment, including electrical" and to "miscellaneous" probably was involved indirectly in transportation.

Changes Now Pending in Transportation Will Make New Demands Upon Industry

In the case of castings and forgings, the proportion of total output going into transportation structures and equipment is even greater than that of finished rolled steel. Similarly, but in varying degree, the railway, highway, airway, waterway and pipeline systems furnish an important outlet for the products of metal stamping plants, plate and structural fabricating shops and general manufacturing establishments.

In view of these relationships, any marked change in the nation's system of transport will affect industry. Therefore producers, fabricators and manufacturers should familiarize themselves with current developments in transportation. They should be prepared to take advantage of new opportunities.

That important changes are imminent is evidenced by the numerous new ventures of the past year. For instance, consider the possibilities implied in the development of the streamlined, diesel-driven, light weight passenger trains, several types of which have been built or are under construction.

If these trains prove as successful in actual operation as has been indicated in preliminary tests, industry within a few years will be called upon to engage in an extensive program of rebuilding railroad power and rolling stock to conform to the new vogue. It would involve important changes in the use of materials and methods. A technic for railroad car building might develop which would more closely parallel the practice of the automobile industry than that of the railroad car builders of the past.

New Type of Equipment Will Necessitate Many Revisions in Railway Plant

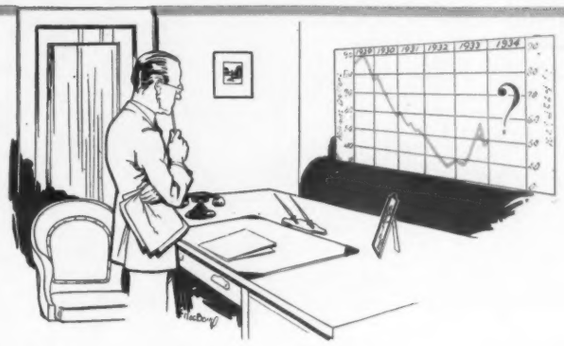
Moreover, general use of these articulated trains would necessitate many important changes in right-of-way, track and terminal facilities. With speeds of 100 miles per hour or more, the majority of existing grade crossings on main lines would have to be replaced with over or under crossings in the interest of safety. Roadbeds would have to be improved, both as to smoothness and curvature, in order to accommodate the higher running speeds. Y's would be installed at convenient points, as existing turntables will not handle the articulated trains. Equipment in roundhouses and backshops would be revamped to handle internal combustion power units instead of steam power units.

A similar, although less spectacular transition is taking place in water transportation. Diesel power is gaining favor in smaller vessels. Alloy steel is being specified more generally to reduce weight and to resist corrosion.

In highway transportation, aside from the well known steady advance in the development of automobiles and trucks, the greatest progress is found in road and bridge building. Steel reinforcing is used more extensively in the road itself and in highway guards. Rivers, valleys and bays —once considered too broad to be bridged economically—now are being spanned by steel to facilitate the flow of motor traffic. Here, as hinted in the article on page 23, alloy steels may be used more extensively to reduce dead weight.

Today the outlook for marked changes in the methods of transportation is brighter than at any time in several decades. The iron, steel and metalworking industries should be among the first to grasp the opportunities presented by the rebuilding of this important national service.

THE BUSINESS TREND



Wage Increases Again Force Price Factor To Fore

BUSINESS seems to be assuming a slightly more positive tone. The signs of hesitancy which were evident in the last half of March are less pronounced.

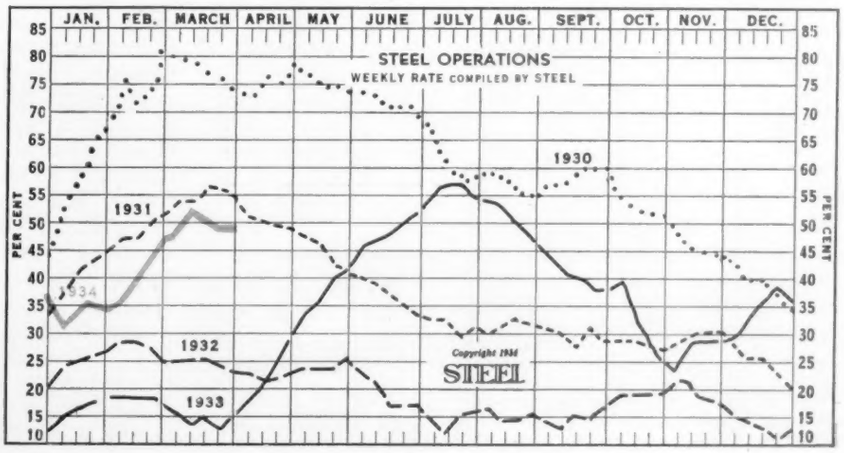
This subtle change may be attributed partly to the avoidance of an open break in the labor situation in the automobile industry and in some measure to indications from Washington that the administration—in order to save its face on recent mistakes—is inclined to be more reasonable in its treatment of industry.

Meantime, the certainty that another movement for higher prices is under way is stimulating buying in certain industries. Most of the groups which increased wages in accordance with the wishes of the administration feel that they now are forced to push up prices. In many instances, the prices obtaining in early March fell far short of covering the higher costs of labor and material incurred by earlier wage advances. The result is that the latest rise of 10 per cent in wages is considered sufficient justification for price advances, the prolonged complaints to the NRA consumers' advisory board notwithstanding.

The current upswing in the price of the products of industry will tend to widen the gap between the prices of goods the farmer buys and those of farm products which he sells. The bureau of agricultural economics reports that the index of farm prices for the month ending March 15 remained at 76, while the index of prices farmers pay for commodities increased from 119 to 120. Thus the trend is the reverse of the avowed objective of the new deal.

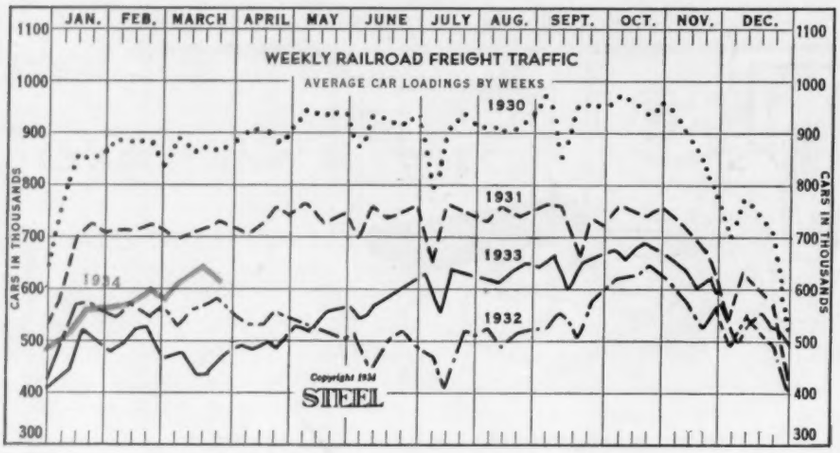
Weekly Reports of Industrial Activity Show Resumption of Interrupted Upward Trend

Electric power output, revenue freight car loadings, soft coal production and steelworks operations—weekly barometers which wavered uncertainly in March—again are pointed upward. The outlook for the immediate future has improved in the past fortnight.



1934	
March 31	49
March 24	49
March 17	50
March 10	51
March 3	48

1933	
April 1	16
March 25	14
March 18	15
March 11	14
March 4	15



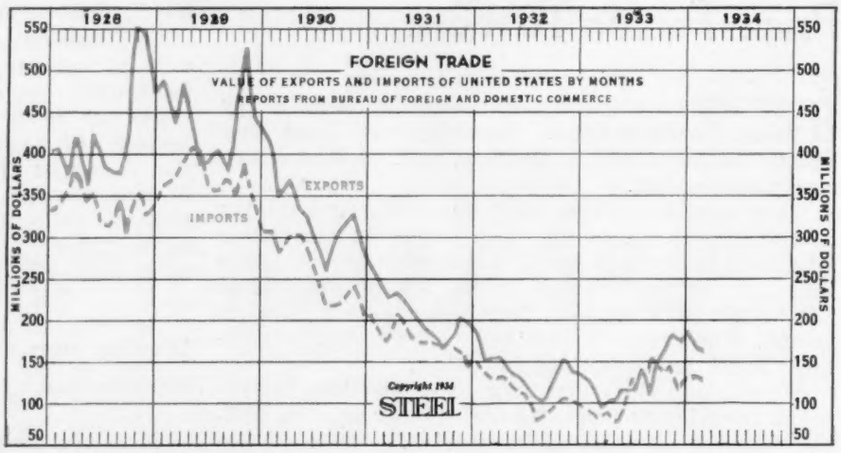
	1934	1933
March 24	608,462	479,959
March 17	624,773	453,637
March 10	612,402	441,361

Freight Car Loadings Off; Exceeds 1933 Movement

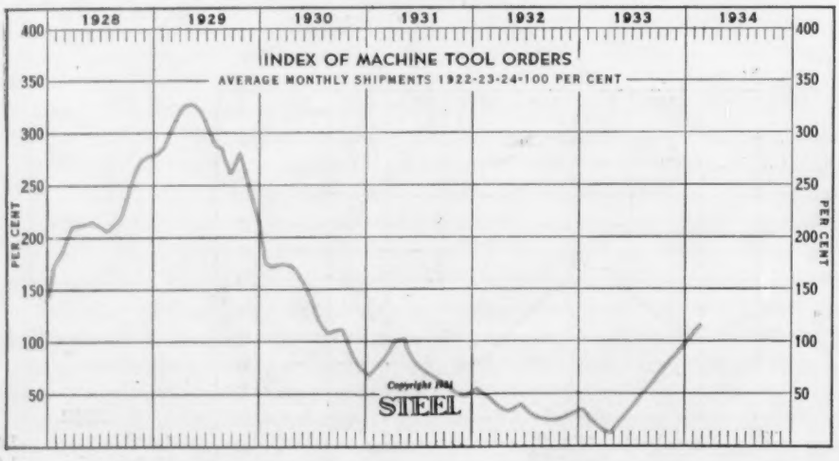
Loading of revenue freight in the week ending March 24 totaled 608,462 cars, according to the weekly report of the American Railway association. This was a decrease of 17,311 cars under the preceding week, but an increase of 128,503 cars above the corresponding week in 1933. All districts reported increases for the week of March 24 compared with the corresponding week in 1933. Preliminary figures indicate a higher volume for the week ending March 31.

February Foreign Trade Declines Slightly

The total value of this country's foreign trade declined slightly in February. The value of merchandise exported during the second month was $162,805,000 as compared with $170,000,000 in January and $101,515,000 in February 1933. Total exports for the first two months of this year were valued at $335,029,000 as against $222,104,000 in the same period of 1933. Imports in February at $132,938,000 compare with $135,000,000 in January and $83,748,000 in February, 1933.



Exports		Imports	
Feb., 1934	$162,805,000	Feb., 1934	$132,938,000
Jan., 1934	170,000,000	Jan., 1934	135,000,000
Feb., 1933	101,515,000	Feb., 1933	83,748,000



February, 1934	104.8
January, 1934	103.6
February, 1933	27.5

February Machine Tool Orders Down; Shipments Gain

The February index of machine tool orders is considerably under January, having dropped from 101.7 to 86.4. However, the three-month moving average still shows a slight gain for the second month. According to the National Machine Tool Builders' association, the three-month average for February was 104.8, the highest point reached since 1930, and compares with 27.5 in February, 1933. The shipment index advanced over 33 points to 96.5 and compares with 26.7 in February a year ago.

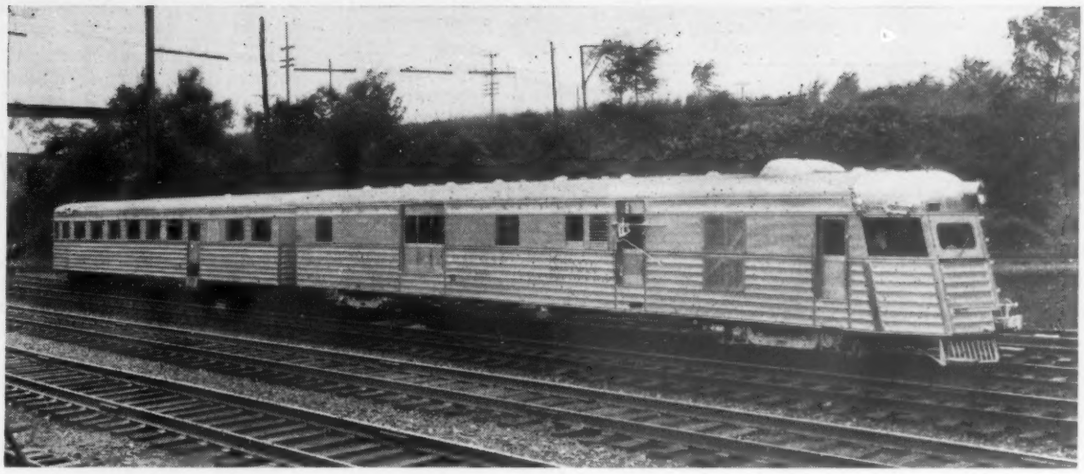


Fig. 1—Two-car stainless steel, stream-lined train built for the Texas & Pacific railroad

HIGH SPEED RAILWAY CARS PIONEER NEW FIELDS FOR STAINLESS

BY EDWARD G. BUDD
Edward G. Budd Mfg. Co.

BROADLY speaking, there has been no improvement in structural steel over the past 50 years. This is a remarkable condition, in view of the widespread and ingenious uses to which it has been put. To illustrate what can be done, given a material worthy of our modern engineering skill, the author proposes to outline development which has been taking place in his own company.

This development was inspired by a growth of appreciation of the potential economies to be had by light-weight construction. In our business of manufacturing automobile bodies, we had by our designs always been able to give greater strength with 10 per cent less weight, but beyond this little could be done because of effects of corrosion. Any program in great reduction of weight on large structures was predicated on having a material of great strength and of sufficient corrosion resistance to enable its use in very thin gages.

Such a material was found in one of the stainless group, now known as 18-8, as well as by a score of trade names, such as Allegheny Metal, Rezistal, Enduro, Defistain, and others. This metal is an alloy of low-carbon steel with

RAILROAD cars, constructed from welded stainless steel and weighing less than one-third as much as an ordinary car, although possessing equal strength, are expected to exert a profound influence on rail transportation during the next few years. What this development will mean to the railroads was set forth recently by Edward G. Budd, president, Edward G. Budd Mfg. Co., Philadelphia, in a lecture delivered to Prof. Georges Doriot's class in Business Policy 1, Harvard Graduate School of Business Administration, Boston. Portions of the lecture, dealing with the fabrication of high-speed, stream-lined cars, are presented in this article. Mr. Budd concludes by making some interesting observations on the use of stainless steel in other fields.

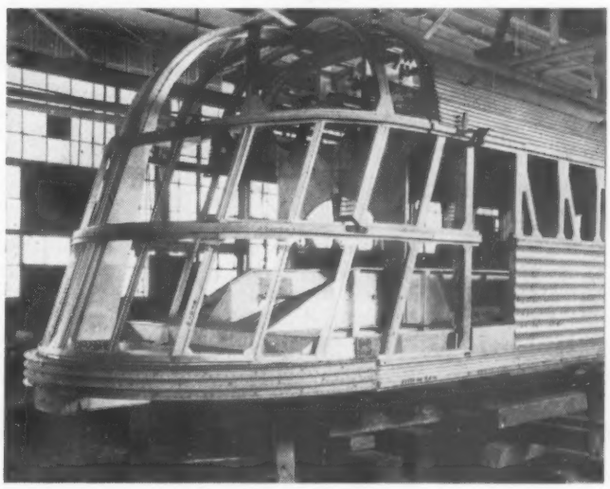


Fig. 2—The front end construction of a high-speed, stream-lined train built for the Chicago, Burlington & Quincy railroad. The heavy front structure is clearly visible

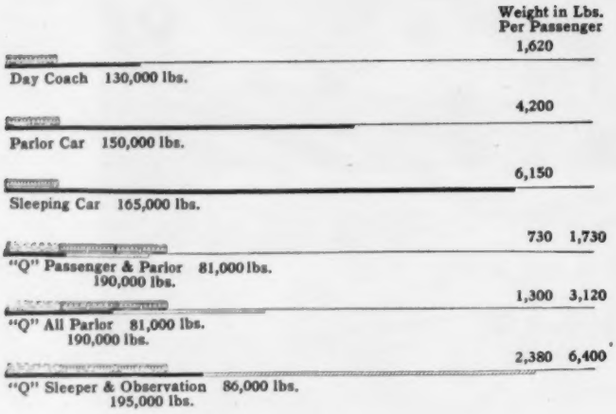


FIG. 3—Graphic representation of railway car weights per passenger. Top three are for standard equipment; bottom three for stainless steel equipment — figures at extreme right include diesel power unit

18 per cent chromium and 8 per cent nickel. It has been some years since its original discovery by Krupp, but so outstanding have been its stainless properties that these destroyed all perspective as to its possibilities in any usage outside of that of cutlery, novelties and other small articles. It has attained almost universal use in cutlery.

Price was correspondingly formidable when our engineers first commenced to investigate its promise as a suitable material for lightweight construction—against the price had to be balanced the qualities. It was found that simply by cold rolling the metal could be given a tensile strength even greater than that of the best spring steel, and yet, while in this condition, retained the ductility necessary for bending and other operations of fabrication.

The author thinks the discovery of its adaptability to structural work, such as railway cars, ships, bridges and buildings, lay with the development engineering department of our company under the leadership of Col. E. J. W. Ragsdale.

The metal is very much stronger than the steels we normally use, with the result that the impression has prevailed that it was extremely difficult to work. Our people have proved however, that with its great strength it has an equal ductility, and if we provide equipment that has the power, we are able to manipulate this steel even better than the mild steels we have used heretofore.

Ductile With Increased Strength

With an ultimate strength of 90,000 pounds in the annealed state, by cold working it attains a strength of 180,000 pounds, and to a degree far beyond mild steel it retains much of its ductility along with this increase of strength. An amount of reduction in rolling, which will give this steel its great strength and without destroying its ductility, would destroy the ductility of mild carbon steels.

Fig. 4 compares in cross-section one of our stainless steel members and a standard rolled section of approximately equivalent physical properties. Note can be made of the extremely thin sections of steel which we use, and the fact that we can put the stronger sections in exactly the place where they will be stressed to their proper limit.

This cross-section illustrates another one of the valuable properties of the material from a structural standpoint. In each section of this beam is the right amount of metal to stand the strain to which the section is subjected and no more, with the result that in some places steel not more than 0.012-inch thick is used. It would be impracticable to use such a section in mild steel, because rust would destroy the section immediately. In that this material is not subject to corrosion, it is perfectly safe for use, since it would stay of equal strength for an indefinite period.

Closed Sections Made Possible

Present conventional structures all are made so that they can be painted throughout to avoid rapid corrosion of the ordinary steel. With the stainless steel, the designer has greater freedom of action and can satisfactorily design closed sections giving maximum of strength with no provision for accessibility for painting.

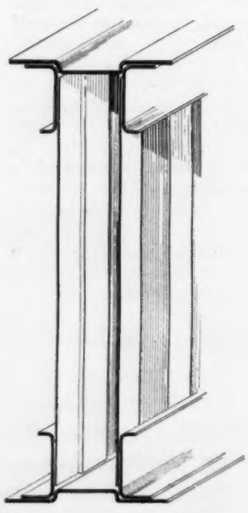
Having the material and theory of construction, our next problem was to devise a method of uniting the various members of the structure into one unit. Up to now, screws, rivets and bolts have been the accepted joining members, and they have been so designed that they will fit all of the normal requirements in the manufacture of structure from mild steel. All of these methods of uniting involve a substantial loss in the cross-section of the member and, consequently, require greater thickness for a resulting strength. This increase in the thickness of the parts is not a serious matter from the cost standpoint, in that the material is so inexpensive and need not be considered seriously from an economic standpoint, as long as weight is of no particular moment.

Lighter Structure More Economical

When we first proposed using the high-priced material, it became necessary to get minimum weights on account of the first cost of the material and also to realize other economies which come with a lighter structure. Our people were skilled in the welding arts, have been the leaders in this kind of work—spot, butt, electric and gas welding—but our experience with the various welding operations made us familiar with weaknesses of the processes and particularly with this new material.

It seemed quite obvious that most of the welding would need be something in the nature of what is known as spot welding, and yet it would have to be a much more delicate and dependable operation than spot welding as we had practised it. It was most essential that we have definite assurance that every weld would be a good weld and would carry an equal load; furthermore, that it should in no wise impair the metallurgy of the metal. Col. Rags-

FIG. 4 — Cross-sections of stainless steel member and standard rolled structural section of approximately equivalent physical properties. In the former, metal is placed at the point necessary to withstand strain



Moment of Inertia 12.2 Ins.⁴
Area 1.08 Ins.²
Weight per Foot 3.8 Lbs.

Moment of Inertia 12.1 Ins.⁴
Area 2.87 Ins.²
Weight per Foot 10.0 Lbs.

dale and his staff, as a result of careful study and long and many tests, developed what we now know as the Shotweld process (see STEEL, June 13, 1932, page 11), which is almost an instantaneous operation. He found it essential to have a weld that did not come to the surface of the metal on either side, even when the members to be welded were so thin as 0.01-inch.

Fig. 6 clearly shows a weld to unite two pieces, each 0.01-inch in thickness. There is a tiny ingot of steel which for an instant was molten. Fig. 7 illustrates a shotweld through eight sections of steel, each about ⅛-inch thick. It will be noted that there is a molten ingot extending all through the eight sheets, this ingot being larger in diameter at the joints of the sheets, and stopping before it reaches the surface of the outer sheet on either side.

In the ingot the material has a temperature of approximately 2600 degrees Fahr., while 1/32-inch away from it at the top and bottom, the temperature has not been more than 500 degrees, showing not only an almost instantaneous heating of the ingot by the flow of the electric current, but also an almost instantaneous chill through the surrounding cold steel. This gives a proper anneal of the metal, since this material, contrawise to steel, is annealed by dipping in water from a temperature of 2100 degrees. We are thus assured of a continuity of metal joining these pieces of metal, and assured that the metal at the juncture shall be in its best condition for resisting shear and fatigue.

Superior Material Used

We now start the building of our structure with a most superior material and a most superior way of uniting one piece of that material with another. We are free of any limitations in regard to painting and have no fear of rust developing in closed sections. The designer therefore is free to place this metal just where it is in the line of strain, and in just a sufficient amount to withstand the stresses. We find that our various members can be applied to a few simple cross-sections.

Our engineers had but begun their work when they selected the material, and at almost every step it was necessary to depart from preconceived ideas as to structures and structural work, and also preconceived ideas as to the cost of the finished product, as compared with the cost per pound of the raw material. In many cases, the high price of the raw material is entirely offset by reductions in the weight used.

Applications of this type of construction are endless, but one naturally turns to the manufacture of a product where the saving of weight would give the greatest return. This led to our building of railway cars. We built our first car in the fall of 1931; it was put in actual service and gave a good record. We have since built five additional units and are now finishing one train of three cars for the Burlington railroad, which has to run at speeds beyond that heretofore attained. We are also building a five-car train for elevated railroad service for the New York Rapid Transit Corp.

Comparative Weights Shown

Fig 3 shows the weight per passenger of railway cars now in regular use on various roads, and at the bottom the weight per passenger of the unit we are building for the Burlington railroad when fitted, in the first case, for standard passenger car seats; secondly, when fitted for Pullman chair seats; and third, when fitted up for sleeping service, counting in each case the seats filled.

These figures show the weight per passenger without the power unit. In the trains we are building, we are placing a diesel power unit in the forward car, and in the second column of Fig. 3 are shown the dead load per passenger when the power unit is figured. In the case of the present standard equipment this would be a locomotive, and in the case of our equipment, a diesel engine mounted in the front car, electrically driven. This reduction of weight is attained by use of more expensive material, and the car as a whole will be more expensive, but when the cost of the power unit is included—locomotive in the case of steel and diesel in the case of our train—the initial price for the whole unit is less rather than more, and the costs of our train with the perfection of the art will be greatly reduced.

The first essential in the mind of the railway manager when purchasing cars is that of safety. He must expect on some occasions there will be collisions, and he must be sure the cars are so built that in case of collision the body of the car will remain approximately in its same shape, thus serving as an enclosure to protect the passengers. If the car collapses under the blow of the collision, the passengers will be squeezed between the partitions or between the seats, and if the collision results in the cars being thrown over an embankment, the car body must be strong enough to retain its shape, preventing the passengers from being thrown outside or being crushed by the collapse of the car. In any changes in the design of railway equipment, safety must be considered as the first essential.

If a 30-ton car should strike a 70-ton car, the blow would be proportionate to their combined weight and the damage to the 30-ton car would be correspondingly less. What destroys or damages a car in a collision is not the weight of the passengers but the weight of the car itself. If the greater strength of material leads to less weight, the less weight reduces collision force and permits less weight of steel.

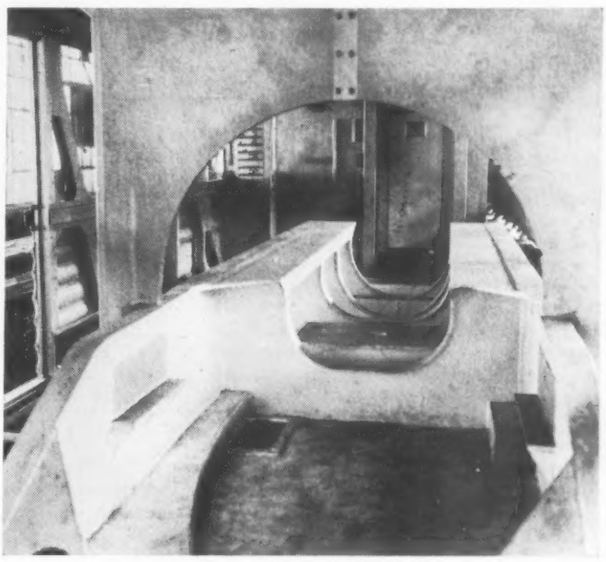


FIG. 5 — The welded engine bed of the Burlington train, looking toward the rear. By means of this structure, the power plant becomes an integral part of the train

Strength With Less Weight

Now, if we make our 70-ton car of material having three times the strength of ordinary material, broadly speaking we could then make the car one-third the weight and have an equivalent strength. Therefore, if our new light-weight, high-tensile car is placed in a train with the present type cars, the reduction in weight must be something under the ratio of the strength of the 18-8 steel to that of the mild steel, or about one-third. If these cars are not to be put in trains with the present type cars, but are always to be kept in separate trains, in the case of collision between this train and a heavy train, the violence of the blow struck is only that of the weight of the lighter car. If we assume that

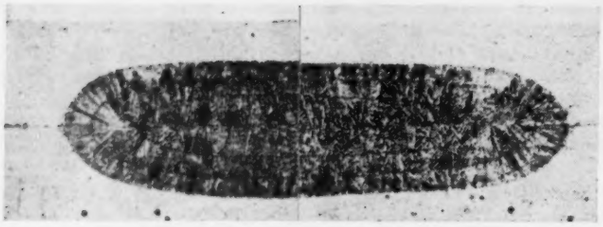


FIG. 6—Photomicrograph of a shotweld uniting two pieces of stainless steel 0.01-inch thick

the material of which the lighter car is made has three times the strength of the material in the heavy car, then the reduction in weight of the light car in proportion to the heavy car would be much more than one to three. A figure of one to five would give a car having a greater protective value to the passenger.

This refers to weight economies longitudinally, subject to draw bar pull or collision. There are economies also in a vertical direction. The lighter weight of the body makes possible a great reduction in the weight of the springs, trucks and wheels, and a very great reduction in the rate of wear and tear on the rails, ties and right-of-way. This reduction in weight in the structure itself leads to corresponding economies in the power plant.

Greater Saving Indicated

As to the cost of the new type of equipment, there has not yet been any production upon which to base a reasonable estimate. It does seem clear, however, that the economies promised will wipe out a much wider price differential than is now indicated. The issue becomes confusing if predicated on a per pound basis rather than one of earning capacity. For instance, a locomotive and tender cost some 18 cents a pound and a coach about 20 cents. It is difficult at first to see where stainless steel at a material cost of 30 cents per pound can ever enter into competition. Again, a locomotive figures around $30.00 a horsepower while diesel-electric drive comes to $80.00 a horsepower.

But such is the cycle of weight reduction that one pound saved in appointments saves another in structure; these two save a third in power plant, and all three justify a re-analysis with even further weight reductions until finally the passenger, or pay load becomes, for the first time, a significant part of the whole.

Perhaps a minor, but still a very important factor, lies in the maintenance of this equipment. We recommend sending out the product with no paint on it; it retains a brilliant silver finish permanently. The repainting of rolling stocks is a large item of expense to the railroads. The cleaning of the painted surface is difficult and expensive. To keep cars looking bright, they have to be washed with soap continuously. The very high finish of the surface of our cars prevents adhesion of foreign material and the car needs only wiping or brushing off. The saving in painting and washing is quite an asset. The material combines handsome appearance with utmost utility.

In extremes of heat or cold, the highly polished outer surface of the car is a great insulator. A painted car exposed to the sun in the summer becomes so warm that the hand cannot be placed on it, but in the same sun the stainless steel train remains temperate. Combination of a bright surface and low heat conductivity of the material co-operate to maintain moderate temperature within the car.

While we feel at the moment that the greatest field for this new art is in railway cars, its availability in other directions is being actively demonstrated. A few years ago the matter of weight in ships was not given consideration. The bottom member of a ship often would be a slab of steel 1¾ inches thick and perhaps 18 or 20 inches wide, and the plates of the ship were made not only strong enough to resist collision but also to resist the corrosive action of the salt water. The shipbuilder's main consideration was cubic space rather than weight. While the hull was made of iron, the interior fittings have always been largely of wood.

Ship Interiors of Steel

As long as 25 years ago, the writer undertook to design interior fittings of ships of steel. A stateroom, a duplicate of one of the finest rooms on the LUSITANIA, was built. Some ten years later our company designed similar work for one of the great passenger steamers on the lakes. From a manufacturing standpoint, these designs were entirely practicable, and while the costs were somewhat excessive, the safety from fire might have justified the costs. But the material used was mild steel, readily corrosive, and the method of uniting these sheets together was not good. Both endeavors failed. Now with this new material and new art of construction and a new method of uniting parts together, we find one of the great fields to be in the ship industry.

We are manufacturing partitions, masts and spars of this material which will be indestructible from the action of the atmosphere, which will be very much lighter in weight, which in many cases will be much more compact and thus save cubic space within the ship, and will greatly reduce the cost of maintenance through paint or other protection. It is our belief that the field for this product will be generally recognized by the shipbuilding industry.

Cutting Dead Weight of Bridges

The third in order of development is the bridge industry. The main stresses in bridges lie in holding up themselves. In the case of the Golden Gate suspension bridge, under ordinary methods of construction the weight of the roadway alone will be 500 pounds per square foot. This weight hanging out 2000 feet away from the pier is the main strain which the cables, piers and towers have to stand. With our construction this could be cut nearly in half, with consequent great savings in the original cost of cables and foundations, and then in that the material is noncorrosive, the great cost of protecting from rust is an annual saving.

In this art we have an interesting field in the renewal of the floors of existing bridges. A bridge that has become overloaded by use of heavier vehicles need not be replaced; in many cases it is practicable to reduce weight of floor 200 pounds per square foot by putting on a new floor, hence doubling the carrying capacity of the bridge and making it satisfactory for years to come.

We believe our endeavors will

(*Please turn to Page* 49)

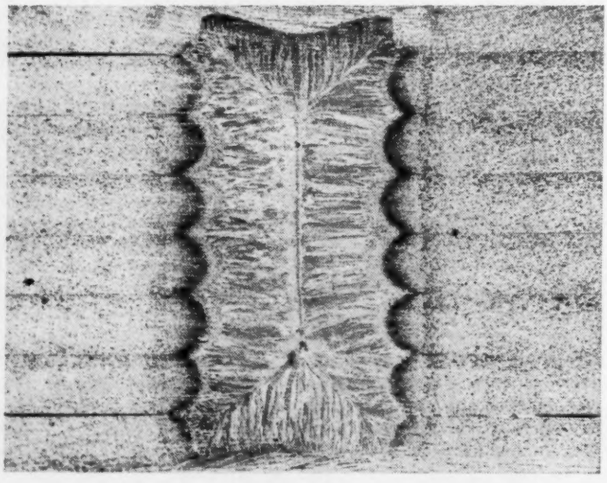
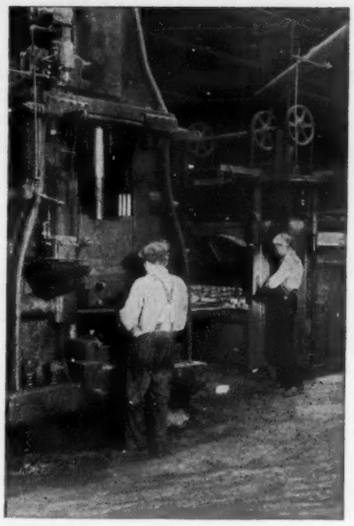


FIG. 7—Photomicrograph of a shotweld through eight sections of ⅛-inch stainless steel. Note that the molten ingot stopped before it reached the surfaces of the two outer sheets



Making the Most *of* METHODS AND MATERIALS

Prefinished Steel Sheets Can Be Fabricated

Prefinished sheet steel, suitable for fabrication into automobile instrument boards, garnish moldings and a wide variety of other parts, is claimed to have been perfected. Key to the process has been the development of a durable finish treatment and at present this has been carried to the point where it is feasible to draw, stamp, blank, bend and otherwise form the finished sheet without any impairment of the finish.

The desired finish is lithographed on a layer of special varnish applied over a paper backing and then covered with another layer of varnish, comprising a transfer sheet. In application, the flat steel sheet is cleaned, coated with a special adhesive, the transfer applied over the steel, and the paper backing stripped off. After baking the finish becomes firm and resilient, unmarred by subsequent forming operations. At present, welding of the finished material is not possible.

Variety of finishes and colors possible is apparently limitless, including marble imitation, grained wood, stippled, plain color, geometric designs, and the like.

$ $ $

Gear Teeth Hardened by Oxyacetylene Flame

Considerable interest is being shown in Great Britain in surface hardening gear teeth about the pitch line by the oxyacetylene flame. Variability in results obtained in hand methods resulted in development of a machine to give mechanical control of the process. For gears too large for quenching or case hardening, it provides a means whereby a wearing surface of from 450 to 700 diamond brinell can be obtained. Since parts so treated undergo little or no distortion, it is valuable also for medium-sized work. Briefly, the machine consists of a suitable tank in which the gear is immersed up to the center in water to leave the surface of one tooth flush with the cooling liquid. An oxyacetylene blowpipe of special design is attached to a motor-driven head, so arranged that the flame travels at a predetermined speed over the exposed surface of the tooth. A jet of water, or in some cases nitrogen, following the blowpipe quenches the heated surface. An indexing device pitches the gear wheel around tooth after tooth; after one side of every tooth is hardened, the gear is reversed.

$ $ $

Clean Surface for Lacquer

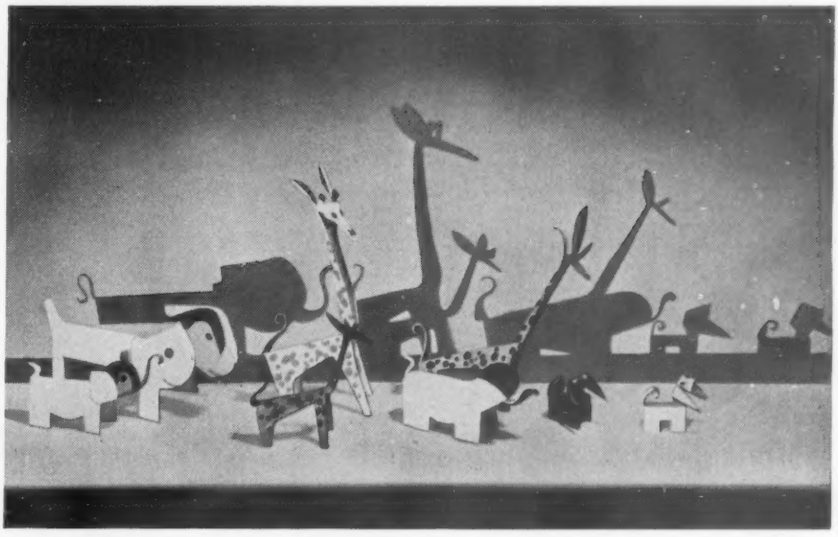
In general, lacquer requires a cleaner surface than ordinary oil finishes. Traces of grease or oil hinder adhesion greatly, and although methods of cleaning have been much improved in recent years, the designer can well assist in this important procedure. If metal parts have blind crevices, moldings, etc., where pickling or plating fluids, drawing compounds, grease or other undesirable material can accumulate, either over-expensive cleaning or poor adhesion of finish will result. With this in mind, it will often be possible to design an article so as to avoid the difficulty and leave only easily reachable surfaces.

A well-known automobile manufacturer uses a hard-faced hot trimming die for a ring gear forging for trucks. This die is 10 3/16 inches diameter and made of vanadium steel with a small amount of stellite applied to the edge. The plain vanadium steel dies gave 2000 pieces per grind, whereas 43,000 pieces per grind have been obtained with the hard-faced dies.

$ $ $

Mishaps in Changing Tools On Punch Presses

While removing punch holders from presses, operators sometimes are inclined to place the shank clamp nuts



ANIMAL KINGDOM PARADES IN PORCELAIN ENAMEL: This interesting menagerie is on display in the offices of the Ferro Enamel Corp., Cleveland. The animals, made of metal and unbreakable, are attractive in their shining coats of color. They were designed by H. Edward Winter, Cleveland artist and designer, who recently executed ten large porcelain enameled metal murals which hang in the company's offices. In the summer of 1932, the Ferro Enamel Corp. built in a suburb of Cleveland the world's first porcelain enameled steel house; last year a similar one was erected at the Chicago Century of Progress exposition

upon the knockout attachment lugs which protrude conveniently from each side of the ram. Another operator, prior to setting up another tool in the press, may turn on the switch and press the treadle to determine if fuses are in place on the machine, with the result that the up and down movement of the ram frequently jars the nut backward to wedge it between the lug and the gib. Since lugs are cast integral with the ram, they may shear off, or fragments of the nut or gib may be thrown out with considerable force. In one shop, mishaps of this kind occurred twice in one week, but in spite of this, press hands persisted in placing nuts upon the lugs. To eliminate this practice, the management finally was obliged to install sheet steel guards over the lugs.

Tanks Are Bolted Before Welding

THROUGH a new method af fabricating welded steel storage tanks, the Columbian Steel Tank Co., Kansas City, Mo., has effected considerable savings in field erection costs and at the same time has obtained greater accuracy and precision. The method simply involves the use of catch bolts to hold the various sections in place prior to welding.

The sheets or plates are cut, curved and punched in the shop using the machinery ordinarily employed in constructing bolted tanks. However, the bolt holes are punched 12 inches or more apart, instead of every 2 inches as in the case of regular bolted tanks.

Shipped to the erection site, the sheets are set up and catch bolted through the scattered bolt holes, then trued to round and plumbed. With the tank sections held rigidly, the welders proceed to weld all seams inside and out. A tank constructed by this method is shown in the accompanying illustration.

According to the manufacturer, this innovation in practice saves much time and results in a superior type of tank. It eliminates completely the possibility of warped, off-round tanks.

Stainless Conveyor Belts

To avoid formation of mold on continuous belts used in packing plants for conveying freshly cleaned vegetables, an equipment manufacturer is making these belts from stainless steel instead of rubber. Stainless steel belts as long as 30 feet with only one joint have been used successfully. The same manufacturer employs stainless steel and tin plated cold-rolled carbon steel for parts of a slicing machine most susceptible to corrosion. The knives are of stainless steel and are removable. Fruits or vegetables to be sliced are placed in traveling containers, made of carbon steel, which are slotted and grooved and move through the set of fixed knives.

Adjusting Radiagraph Unit For Circular Cutting

When making circular cuts from steel plates with the radiagraph, it usually is necessary to support the disk so the end of the radius rod will not begin to fall near completion of the cut. The normal set-up then should be one that provides support for both the disk and the plate, which takes time to adjust. The radiagraph operator in one plant avoids this when cutting circles. The recommended tip size, pressures and speeds are selected for the thickness to be cut. After the start, the gas pressures and speed are adjusted carefully so that only a small part of the slag drops freely. The remaining slag bridges the kerf at the bottom and freezes, holding the center disk firmly in place. It may be necessary to make several trial cuts before the proper conditions are found; once the proper pressures and speeds are found, however, little trouble should be experienced. At the end of the cut, a few sharp blows with a hammer will release the center disk. Besides eliminating a bad ending to an otherwise good cut, this practice promotes economical gas cutting as all the oxygen is used to advantage in making the cut.

$ $ $

A large number of special applications of internally heated salt baths now are operating in the high speed and alloy field. It is reported that troubles such as scaling, pitting and dimensional changes have been eliminated to such an extent that some manufacturers have omitted final grinding operations.

THIS welded steel storage tank was set up in the field by catch bolting, after which all seams were welded inside and out

Oil Cans Jump Tin Plate Output

PROFITING by a change in the merchandising of motor fuel oil, tin plate is being used in sharply increased volume for cans to handle this product. Last year 50,000,000 quarts of motor fuel were put up in individual sealed cans; this year indications are that 200,000,000 quarts will be marketed in this manner, or four times last year's amount.

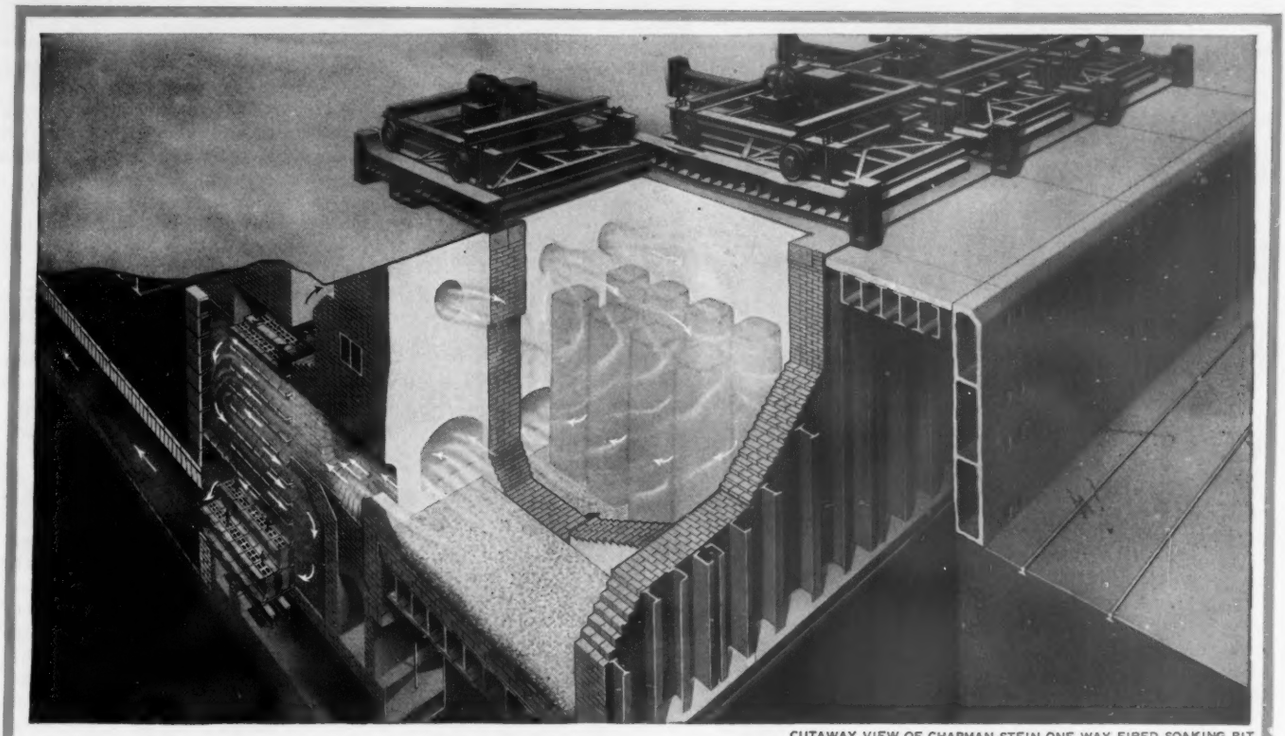
In terms of tin plate, with three and half boxes, or approximately 350 pounds, required for each 1000 cans of quart size, this would mean an increase from 8750 tons last year to 35,000 tons in 1934. And, it is said, the turn in this direction has scarcely more than begun, for the potential production is reliably estimated at 2,000,000,000 cans, or 350,000 tons; in other words, 10 times the amount anticipated for this year. Production could fall far short of the goal, and still undergo further marked improvement.

In addition to quart containers, 5-quart cans for complete refills are being produced, although naturally in a much smaller volume. These cans consume about 10 base boxes per 1000.

Quality of Oil Assured

Of the several advantages claimed for this method of retailing motor oil the greatest is the assurance it offers of guaranteed quality. A recent investigation by a national automobile organization into charges of alleged bootlegging of oil at various filling stations throughout the country revealed that approximately 63 per cent of the oil sold was not of the exact type or quality indicated.

Oil sold in sealed quart containers averages about 5 cents more, but this, it is said, is due chiefly to the fact that most motor oil put in these containers up to date is premium oil. The added cost is expected to be reduced materially as cans come more



CUTAWAY VIEW OF CHAPMAN-STEIN ONE-WAY FIRED SOAKING PIT

NOW GENERALLY ACCEPTED AS THE MODERN SOAKING PIT

One-Way Fired Pits are now accepted as the modern Soaking Pits throughout the Steel Industry because of their many advantages and the important savings which they make possible. With One-Way Fired Pits there are no reversing valves. There is uniform circulation of heat and gases. Fuel, operating and maintenance costs are lower, and there is less loss of metal by oxidation.

Most pits now in use can easily be converted into up-to-date One-Way Fired Pits. If this change is made at the time of a general repair, the cost is little more than for the repair itself.

ADVANTAGES OF ONE-WAY PITS:

1. Fuel saving from 20% to 35% compared to reversing pits operating in the same plant under same operating conditions.

2. Large reduction in maintenance, since there are no checkers or reversing valves.

3. Better heated steel because of the vertical horseshoe travel of flame, and because burner ports are designed to properly mix and direct the fuel.

4. Reduction of scale by controlling the atmosphere in the pits.

5. Chipping costs reduced by 30% to 35%.

Surface Combustion Corporation

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Whether for ingot, billet, rod, wire, tube, bar, sheet, or tin plate, we will be glad to help you plan the most modern and efficient equipment to best perform your heating operation. SC Soaking Pits, Slab or Billet Heaters, Pack or Pair Furnaces, Normalizers and Annealing Furnaces are correctly designed, engineered and built for the individual requirements.

into use for the handling of the more ordinary grades, as is apparently the trend. Certain of the larger oil companies now are retailing all of their grades in cans, it is reliably reported.

To expedite the handling of oil in quart cans, a dispenser can, with a pouring spout and a structure of sharp blades inside, is used. The filling station attendant jams the oil container into the dispenser, onto the blades, which cut the end in several directions, allowing for the free flow of the oil into the dispenser, from which it is poured.

Reinforcing Wire Mat Welding Machine Is Fully Automatic

WITH widespread use of concrete roads, concrete pipe and other reinforced concrete construction has come a heavy demand for a mesh or fabric made from steel rods or heavy wire. To meet quantity requirements for such fabrics, electric resistance welders now are employed, the welding equipment adapting on a larger scale the principle employed in welding wire fencing and other similar materials.

Several types of equipment are available for producing this heavy fabric, methods employed depending upon the tonnage required per unit of time. In one design the welder is fed with wires or rods which have been straightened and cut to length. Each wire is welded where it crosses another, the spacing being varied to suit requirements. This machine produces flat mats from 6 to 10 feet in width and 8 to 12 feet long.

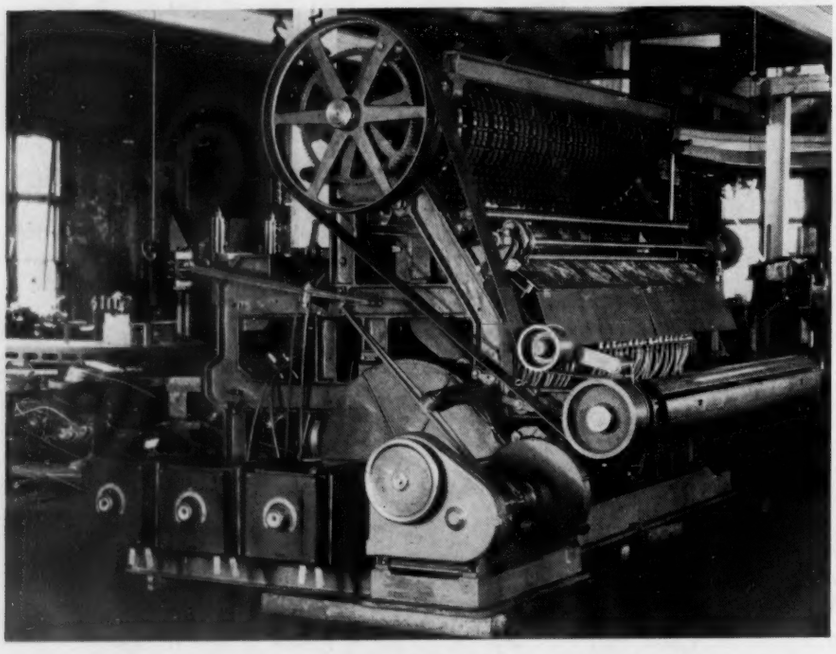
In another type of machine, the transverse wires, already straightened and cut, are fed automatically or semiautomatically into position from a magazine and each one welded across all of the longitudinal wires of the mat at one time. Longitudinal wires may be fed from reels and automatically pulled through straighteners, or may be fed manually or semiautomatically. This machine produces flat mats or can be attached to a reeling device so that the welded fabric may be rolled into bundles. Mats up to 12 feet in width with 20 or 22 longitudinal wires can be turned out, production varying from 10 to 30 tons per 9-hour day, depending upon manual, semiautomatic or automatic operation and the number of wires in the fabric.

The type of machine shown in the illustration, and announced briefly on page 54, March 19 issue of STEEL, is fully automatic, both transverse and longitudinal wires being taken from reels, automatically straightened and fed to the machine. This equipment is installed in the plant of the Wheeling Steel Corp., Wheeling, W. Va., and was built by Thomson-Gibb Electric Welding Co., Lynn, Mass.

Straightened transverse wires are automatically cut to length and placed in position for welding. Longitudinal wires are fed continuously through the machine and the mats are cut to whatever length desired, or the fabric may be reeled.

An individual transformer is employed for each longitudinal wire being welded and these transformers with their welding electrodes are adjustable across the width of the machine to provide for almost any spacing from 2 inches up, in steps of ½-inch. Machines can be designed for unlimited width, although 12 feet is normally the greatest width required.

These automatic fabric welders may be operated at speeds from 20 to 30 welding cycles per minute, depending upon the size of wire. Once the machine is threaded, it produces fabric continuously until the coils of wire are exhausted. The usual procedure is to butt weld the end of a new coil to the end of an old coil before the latter is completely exhausted, thus making the operation continuous for as long a period as desired. A machine of this full automatic type, accommodating fabric 10 feet wide and having 32 welding units, produces 50 to 60 tons per 9-hour day, this amount varying with the size and spacing of the wires.



Transverse and longitudinal wires are fed into this machine directly from reels and 32 welds are made simultaneously. Mats 10 feet wide are produced and delivered flat or reeled as desired

Insulation Block Has High Temperature Resistance

Claimed to withstand safely temperatures up to 1900 degrees Fahr., a new and improved insulation block known as Superex has been introduced by Johns-Manville, 22 East Fortieth street, New York. It is adapted to the insulation of high-temperature boiler furnaces, open-hearth and glass tank regenerators, hot blast stoves, ceramic and rotary cement kilns, and various types of high-temperature metallurgical furnaces.

Increase in temperature resistance has been effected by the use of a special calcined diatomaceous silica. The block is bonded with asbestos fiber. Low density and high insulating value are other advantages cited by the producer.

The New, Industrial Russia Through Sympathetic Eyes

Industrialized Russia, by Dr. Alcan Hirsch; 309 pages, 5½ x 8 inches; published by the Chemical Catalog Co. Inc., 330 West Forty-second street, New York; supplied by STEEL, Cleveland, for $3, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

In this sympathetic, analytical

work on the new Russia, iron and steel rate a chapter, devoted principally to statistics of production, reasons for the location of plants, iron ore resources and high lights of the first and second 5-year plan.

As the title indicates, major emphasis is placed upon the industrial rebirth of Russia, with convincing analyses of the chemical, fuel, transportation, petroleum and other industries, and agriculture.

Nevertheless, the author relates enough of his personal experiences and spices his book sufficiently with pertinent data on customs, living conditions, religion, the soviet system and its leaders and patent law to give the impression of a well-balanced presentation of current conditions.

The approach is one of sympathy with a people striving for better things. Indeed, the average reader will lay down this book quite in accord with the author's concluding words: "Our admiration should not be for the heights to which this interesting nation has reached at this stage in its development, but rather for the depths from which it has so painfully climbed."

Steel Panels for Old Buildings

REHABILITATION of old wood or brick buildings by application of panels of sheet steel, either stainless or enameled, is the aim of a recently developed system for firmly mounting these panels to building exteriors. Mounting strips attached to the wall by means of screwnails or similar masonry nails, are of extruded aluminum, so designed that they fit flat against the building wall and on the front face embody a U-shaped channel or trough into which the bent-over edge of the steel panels fit. Panel edges are turned over at right angles on all four sides, forming a shallow tray. Both horizontal and vertical mounting strips are required, undercutting providing a smooth and continuous joint where the strips intersect.

After panels are placed in position they are held securely by metal fastening strips which are placed in the trough between panels and held down by screwnails. If desired, insulation board may be placed behind the panels, edges fitting between the channel and back face of the mounting strips and completely filling space between the building wall and steel panel.

The method provides a flexible means of renovizing building exteriors, and a wide range of color treatments is possible in finishing the steel panels. Special sections are available for mounting the material around cornices and other projections, as well as for fitting in glass windows and the like.

Spacing between mounting strips or, in other words, the size of the steel panels is based entirely upon the exterior effect desired and the wind load encountered in service. Lightness of the sections dispenses with any necessity for dead-load allowances. Already the material has been used in construction of gasoline service stations, and is being promoted actively for use on exteriors of old buildings. An important new market for sheet steel is suggested. Further details on this interesting development will be presented in an early issue of STEEL.

Close Limits in Grinding Helical Spring Ends

Disk grinding of coil spring ends in the plant of the Gardner Machine Co., Beloit, Wis., is described in an article appearing in the March issue of *Abrasive Industry*. The springs are for independent suspensions systems on new model automobiles and close tolerances are required. The work is done at the rate of 150 springs per hour, on large double-spindle disk grinding machines.

Color Talks when Used on Machine Equipment

Swing away from standard colors on machine tools and other equipment is noted by T. J. Maloney, New Jersey Zinc Co., New York, writing in the March issue of *Machine Design*. Use of bright colors on certain machines is claimed to lead to greater shop efficiency, lower unit production costs and often fewer rejects. Pointing out advantages of using varied colors, Mr. Maloney declares that "color can and does talk."

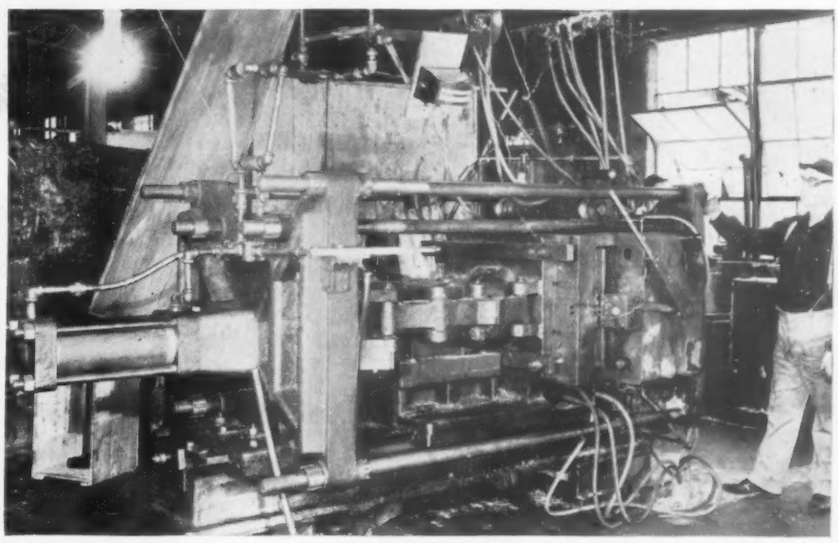
Gummed Papers Adhere Well to Metal Surfaces

Two grades of gummed paper, for adhesion to surfaces for which ordinary gummed paper is not suitable, have been developed by the Gummed Products Co., Troy, O.

One of the special adhesives is designed to stick to aluminum and according to the manufacturer the gumming does not stain the metal. It does not require any special solvent and will stick readily when moistened with water. The second grade is specially prepared for sticking to paint, tin, varnish and other surfaces which may be slightly oily or greasy.

Welding Before Enameling

Several important factors must be taken into consideration when welding for porcelain enamel. L. B. Hart, in the March issue of the *Enamelist*, enumerates some of the chief sources of trouble encountered by enamelers and suggests how some of these troubles may be reduced to a minimum. Difficulties segregate themselves into four main sources: Materials; design and forming; welding equipment; and welders.



MAKES LARGE DIE CASTINGS AT RAPID RATE: This die casting machine in the plant of the Precision Castings Co. Inc., Syracuse, N. Y., has the distinction of making the largest and heaviest aluminum die castings ever produced. Castings weighing 16 pounds each were turned out at the rate of 50 per hour. As shown, the machine has the dies installed and is equipped with a side melting furnace at the rear. Note the thermocouple for indicating die temperatures. The die is opened and closed by a hydraulic cylinder operating with oil at 1200 pounds per square inch; molten metal is forced in at 500 pounds per square inch air pressure

GULF'S 7 POINT PLAN
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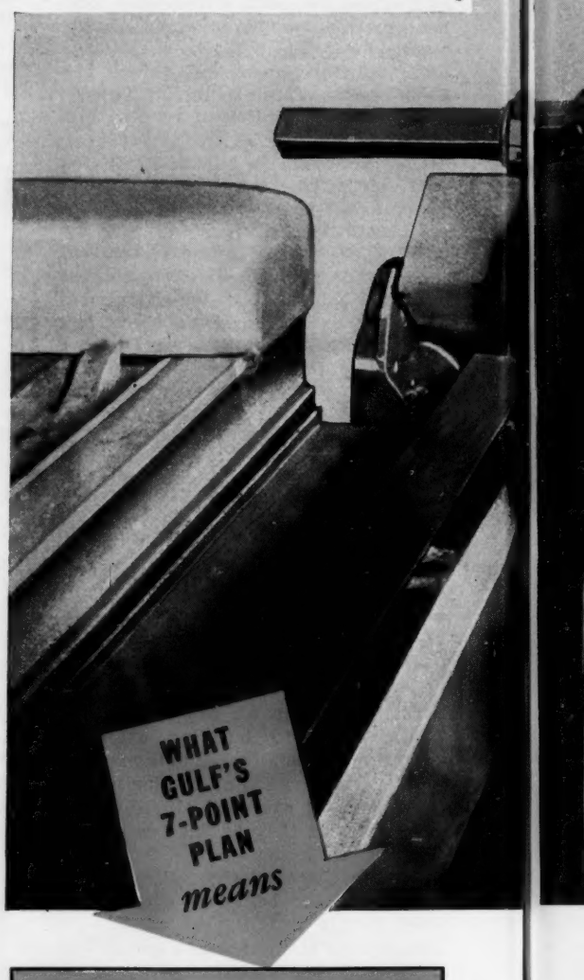
When expensive machines like this are GULF LUBRICATED *continuous operation and lower maintenance costs are assured*



New, expensive machines! Fast, efficient, money-saving, money-making machinery!

But, for how long? How soon will you experience delays—due to shutdowns for repairs?

As with all fine mechanisms, it's a question of how well they are cared for. If they are just "run", they *wear out* and are through in a few years.

Wear is caused by friction. And *friction is the primary cause of machine wear and repair expense.*

You Can Keep Your Machinery New

The Gulf Refining Company has designed a plan to help manufacturers safeguard and prolong the life of their expensive machinery. It is called "Gulf's 7 Point Plan for Industrial Lubrication." It supplies plant executives with a *scientific method of reducing maintenance and operating costs* and saving money.

This modern plan supplants obsolete lubricants and application methods. It is geared to today's operating conditions. *It will minimize the wastes of friction in your plant.*

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1. A means of protecting and conserving the company's investment in costly mechanical equipment.

2. A scientific method of measuring lubrication costs and the influence of lubrication on plant costs.

3. A plan by which a real cost-saving program can be set up in all operating departments.

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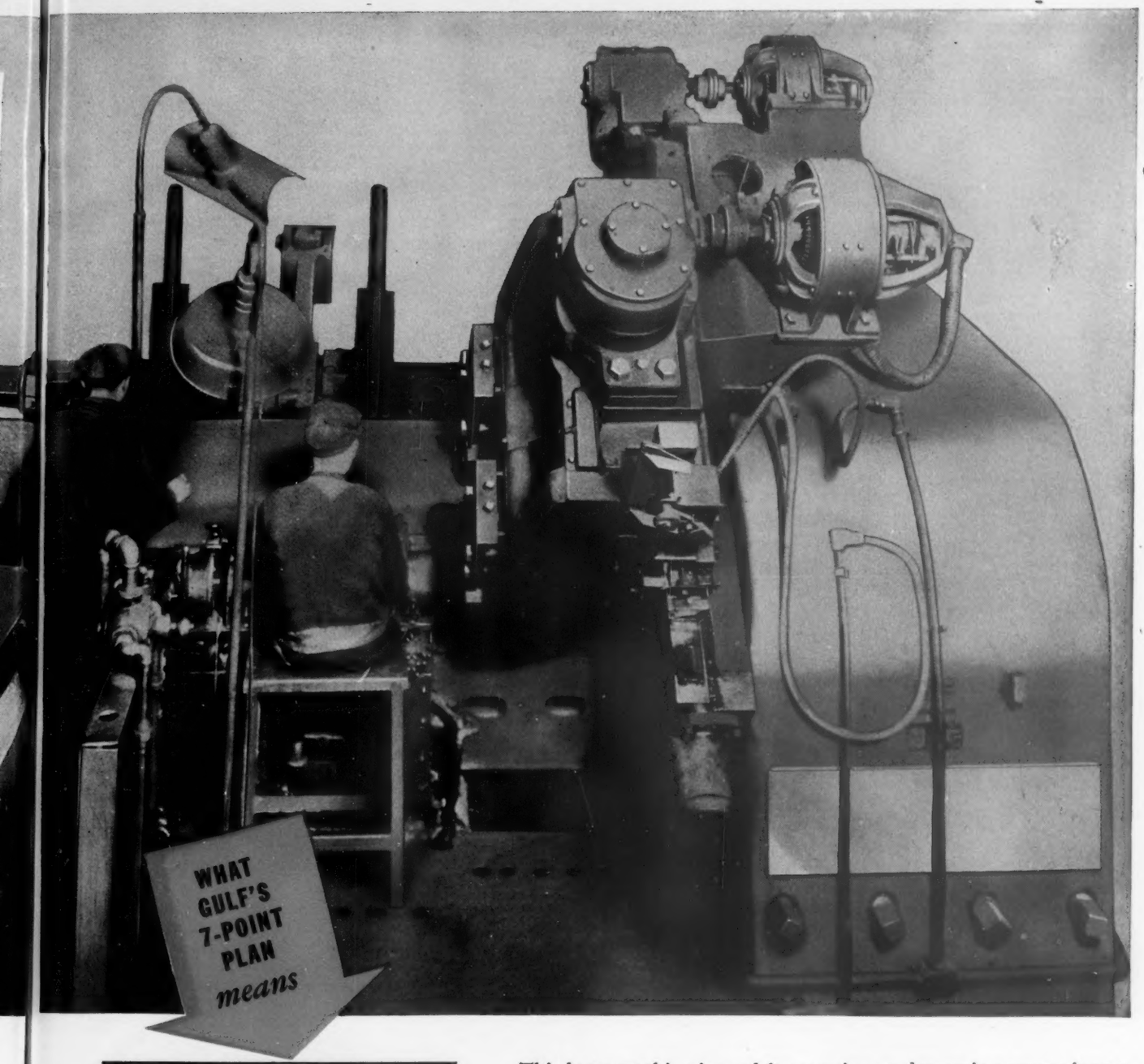

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1. The counsel and assistance of trained lubrication engineers to help you with your operating problems—on the job.

2. An opportunity to reduce power consumption and cost of maintaining mechanical equipment.

3. Ability to operate machinery at maximum speed with minimum adjustments—and resultant increase in both quality and quantity of production.

This huge machine is used for gauging or deseaming square ingots or blooms, an important process in the manufacture of high quality steel. Gulf lubricants keep it operating at top notch efficiency. Photograph by courtesy of the Niles Tool Works Company, Division of General Machinery Corporation.

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APPROXIMATELY 100 tons of steel is required annually for the manufacture of hand trucks, widely used in industry. The model shown here is entirely of steel and is provided with a long skid to facilitate handling a variety of material. The skid is bent at such an angle that the material may be moved in a vertical position

—Courtesy Saginaw Stamping & Tool Co., Saginaw, Mich.

LARGE USES OF STEEL IN SMALL WAYS

258th Article ◆ Hand Trucks

CONSIDERABLE manual handling of bulky articles still is necessary in manufacturing plants despite the development of a number of forms of equipment for mechanical transportation. While cranes, industrial trucks and trailers, gravity conveyors and traveling belts are depended upon for moving heavy and mass products, hand trucks frequently are invaluable for supplementing the functions of such units. Various types of hand trucks are available for this work and, like the major carriers, they are made largely of steel.

Hand trucks are one of the oldest aids to the movement of trunks, boxes and other cumbersome articles. The earliest designs frequently employed wood for handles, the frame being reinforced with steel. In use, the nose, also made of steel, is slipped under the article to be moved after the latter has been tilted and the load then is pulled back to rest on the truck frame. A popular type of pick-up truck, shown above, is made entirely of steel and through the use of a long skid is capable of handling a wider variety of material than is the unit having a short skid. Also, it is used somewhat differently than the ordinary hand truck since it is unnecessary to tilt the article to be moved in order to lift it from the floor.

Avoids Spilling Load

The pointed nose of the truck is slid under the can, barrel, package or tote pan merely by giving the truck a slight shove with the foot. Pressure then is applied in a downward motion of the handle and the load is raised about 1 to 1½ inches from the floor and is carried upright in this position. Being held vertically, spilling of the load is minimized.

This truck is built in two platform sizes, weights being 50 and 75 pounds, respectively. Pressed steel wheels equipped with ball bearings are standard equipment, although solid rubber-tired, canvas, end wood or pneumatic-tired wheels are available. Handles are made of steel tubing, formed in a die, and attached to the base of the truck with bolts and rivets. Flat-rolled steel members, riveted to the handles, provide a strong framework.

Steel plate, ¼-inch thick, is bent cold in a forming die to comprise the truck floor. The end of the plate is machined to a thin edge to facilitate its slipping under the object to be picked up. This type of truck also is adapted to handling oxygen and acetylene tanks or cylinders, providing a convenient means of moving such equipment to the location of gas welding work. Floors on such units are bent at right angles and supported by side bracing straps. An adjustable chain holds the cylinders.

About 100 tons of steel has been consumed annually in the manufacture of this type of equipment, with a somewhat smaller tonnage involved in combination wood and steel trucks.

British Mechanical Yearbook Presents New Material

Mechanical World Year Book, 1934; published by Emmott & Co. Ltd., 28 Bedford street, London, Eng., W. C. 2; 159 pages, 4 x 6 inches; supplied by STEEL, Cleveland, and in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

In the forty-seventh year of its publication, this handbook includes this year a comprehensive section on metals and alloys, brought up to date. The section on machine tools takes up that subject from a new aspect. It provides data and information for machine tool users and machine tool makers.

A new section deals with press work in view of the wider use of pressed metal parts in place of castings and forgings. The usual large fund of general information is included.

Investigate Banding in Chrome-Molybdenum Steel

A study of banding in a chromium-molybdenum steel is the subject of an extensive paper published in the March issue of *Transactions* of the American Society for Metals, authors being E. R. Johnson and W. J. Buechling, associated with the Republic Steel Corp., Massillon, O.

This paper was presented before the convention of the society in Detroit last fall, but here is published in full, with tabular matter, many interesting photomicrographs and discussion which followed presentation of the paper. The authors study the banding tendency in chrome-molybdenum tubing as well as in the ingot and bar stock. Methods for eliminating banding are developed.

ADVERTISING PAGES REMOVED

This 7-room house, requiring 9 tons of steel and costing about $2500, incorporates air cell construction, radiant walls, rubber-steel floors and unified air control. It is designed for shop fabrication and field assembly

Low-Cost Steel House Offers New Features in Design

ADVANTAGES of steel construction are realized fully in a recently developed design for low-cost, shop-fabricated houses. This new type of house incorporates the air cell principle, radiant walls, zeppelin-type floors and unified air control—features which are dependent almost entirely upon the use of steel as the building material. Requiring a little more than 9 tons of steel, including a small amount of structural angles used as the foundation base, the complete unit is estimated to cost about $2500.

The house, designed by C. L. Van Ness, consulting engineer, Akron, O., and shown in perspective in Fig. 1, is two-story and has seven rooms with a loggia or outer apartment on the second floor. It is approximately 24 feet square and has 8-foot ceilings. Walls and floors are built up of 3-foot sections from the front to the back of the house and each tier of sections has intercommunicating air cells as shown in the sketch of air distribution in Fig. 2.

Walls Radiate Heat

With air supplied from central ducts under the floor to alternate cells, the warm air passes through the floor cells and up the walls to be released above the breathing line. This warms the walls along both sides of each room and gives to occupants the pleasant sensation of radiant walls. Intermediate cells are used to return the cool air to be reheated.

The sketch of the room interior in Fig. 2 explains the radiant wall feature in more detail. The inside walls are made up of small steel sheets, stiffened and fastened on four sides, and include bands for air inlet and outlet and removable conduit with convenient electrical outlets. The standard side wall sheets are continued up to enclose the ceiling. With their wide block pattern, the inside walls give a pleasing effect; any treatment which does not cut down radiance may be applied to them.

Floor Units Standardized

From a large number of variables, the designer discovered that the floor unit size of 3 feet at the sides and 2½ feet across the front of the house gives the most efficient dimensions. Multiples of this unit give exact floor size and they are represented by the checkered floors in the sketches.

The load bearing walls are supported by columns, tubular in shape when assembled, at the sides of each section. The outside walls, shown in the sketch of the column section, Fig. 2, are one full story in height with flanges at the sides; these sections are assembled with the adjacent panel flanges inserted between two half-round columns with supporting flanges and securely bolted. Inside wall sheets are assembled in the same manner, two at a time, using the space between the walls for making connections.

Outside wall sheets are hot asphaltum dipped and a durable fiber weather-sheet cover is pressed on and around the flanges. Wall insulation is applied at the same time and is held by connecting end flanges and adhesion. The exterior wall surface may be left natural, painted to suit, or a pressed stone face exterior may be applied with wedge lock support, the latter finish retaining all features of the basic scheme of construction.

Designed to Dissipate Stresses

The actual size of the outside wall sheet is somewhat smaller than the complete inside wall, consequently the outside wall is assembled in tension and thereby places the inside wall in compression. These two stresses are claimed to be dominant features in the wall design. The entire wall structure is resilient and sturdy; it is completely tied to transmit stresses to the full strength of the material. Earthquake and hurricane stresses would be dissipated with momentary yielding, after which the members would return to static position. Each assembled column is capable of supporting a superimposed load equal to the weight of steel in an entire one-story house.

Floor construction is both unique and simple; it combines steel and rubber to form a zeppelin-type floor of great resilience and buoyancy. The method of construction permits sheet steel to assume importance as a floor spanning material for it combines lightness with strength. In this particular case, it makes air-cell construction possible.

Flanges of adjoining floor sheets are tucked in the full length of the sections and fastened btween two light channels. These floor sheets span the width of the section and are formed into a continuous series of shallow pans, unit size, with a parabolic-shaped bridge formation rising to floor level at the end of each unit. The pan portions are developed with contour lines curved about the center, so that stresses are projected radially to the channel sides of the unit to be dissipated throughout the entire floor.

The bridge portion of the sheet acts as a strut between channels for spacing and as a support for the live floor load. The complete floor is stiffened transversely at the four edges of each unit. Blocks of molded rubber, unit size, are dropped in the pans to complete the floor, which in this particular size of house is designed to support a live load of 50 to 60 pounds per square foot. Floors and walls are joined with self-

THE steel house described in considerable detail on this and the following page introduces several new features in design, chief of which are air-cell construction, radiant walls, zeppelin-type floors and unified air control. This unit is intended for shop fabrication. Another low-cost steel house was described on Page 30 of the April 2 issue of STEEL; *several others will be presented in early issues*

formed connections and all joints are hermetically sealed.

Ceiling sheets are the same as sheets used for side walls and are fastened between the lower flanges of the channels, thus completing the air cells between floors and ceilings. Insulation may be used when needed The roof of the house is asphalt.

The entire structure is incased in a skin-tight sheet of steel which stops air infiltration losses, and high-grade insulating material, said to be equal to 12 inches of brick, stops heat losses. No basement or pitched roof is required and, because of the air cell construction, complete control of air circulation is maintained.

Panels Are Shop-Fabricated

According to the designer, steel used throughout for columns, walls, trim, doors and floor spans is 20-gage sheets, with specifications according to use and finish desired. Weight of the steel in the walls is 4 pounds per square foot. Floor channels are 14-gage, and weight of the steel floor is 4.7 pounds per square foot. It is intended that the sections and panels will be fabricated in the shop and delivered to the location for erection; it is estimated that 85 per cent of the work can be completed in the shop and at a very attractive cost depending upon quantity. Outside wall sheets and columns of one piece with inside sheets welded to the flange complete, ready to be hooked together at the point of assembly by means of simple connections, would be the standard practice.

Calculated on the use of prefabricated sections, the house will require 10,055 pounds of steel sheets for the first story, 4548 pounds for the second story and 1603 pounds for the roof, making a total of 16,206 pounds, or slightly more than 8 tons of sheet steel to enclose the structure. This figure does not include material for the entrance, roof wall or base, which brings the requirements to 18,200 pounds, or about 9 tons. The base is 6 x 6-inch angle when a pier foundation is used. Cost of the seven-room house described, shop fabricated and field assembled, is expected to be $2500 in minor quantities. This includes air tempering throughout the year and basic equipment for service.

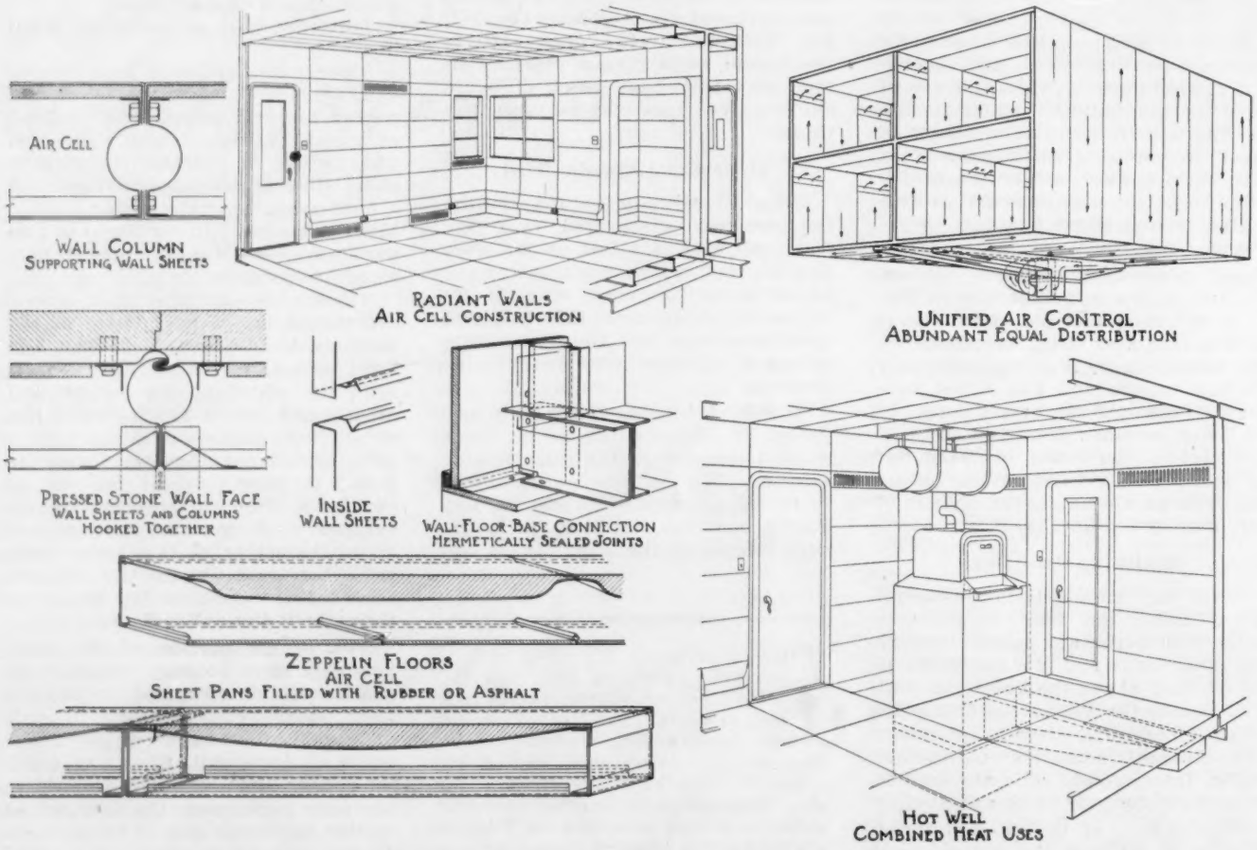
Combination Heater Is Used

In this new type of house, interest is directed to the source of heat in the hot well located in the center of the structure. Here industrial grouping of heat uses is applied ingeniously. The furnace fire tubes supply heat to the oven for baking and to a grill for open cooking, both the oven and grill being placed on top of the furnace. Electric heat will be used for summer cooking. Hot water supply, located overhead, is furnace heated. This arrangement requires less insulation of hot surfaces and more heat is utilized at useful points with greater efficiency than with detached units of heat source. An air washer between the fan and furnace is converted into a cooling cabinet and the system is reversed for cooling during the summer.

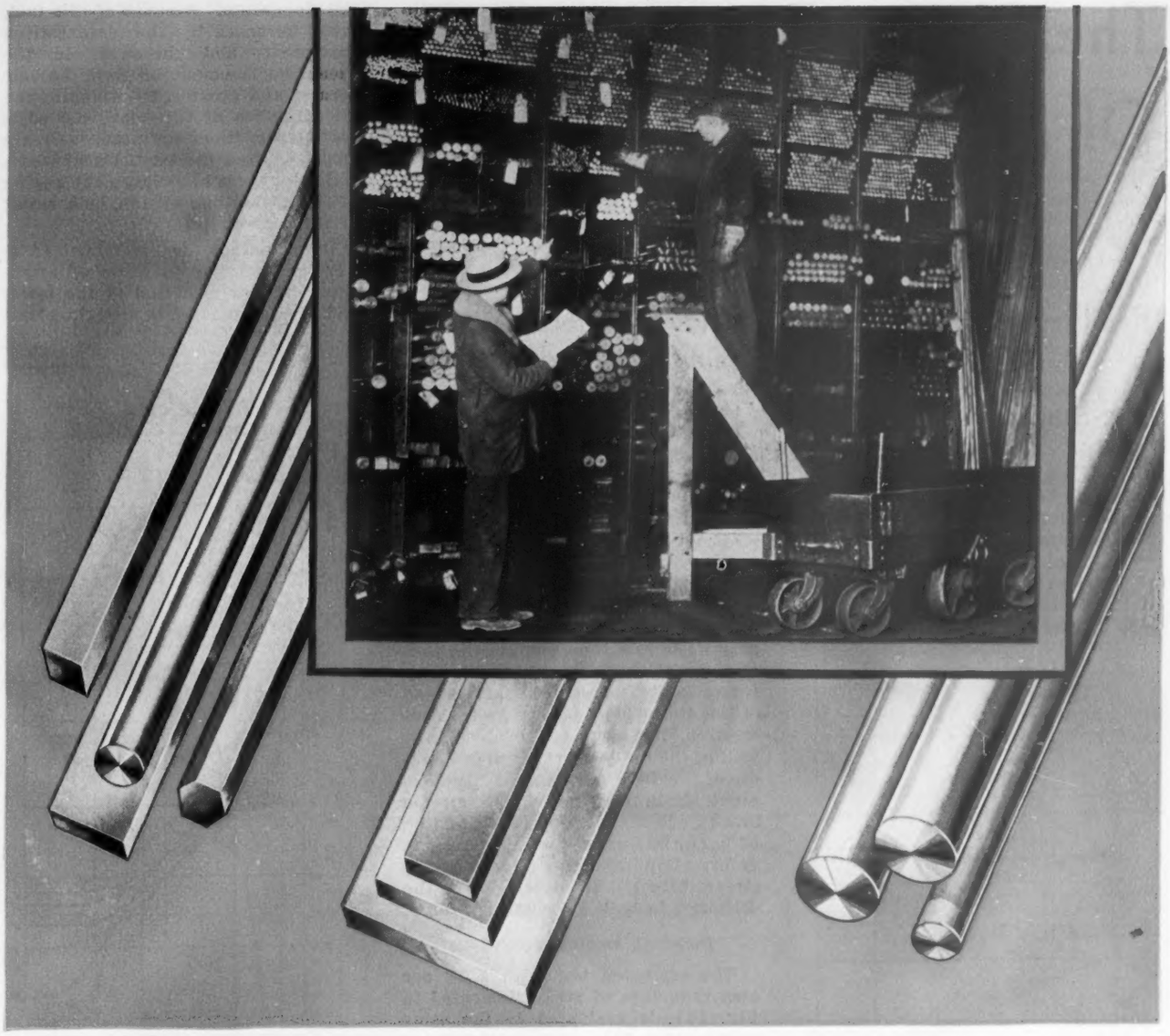
It is pointed out by the designer that among advantages for this type of house are outstanding features for space saving and convenient location of corner windows and corner doors and utilization of artistic circular stairways. The whole house offers unusual freedom for diversified architectural treatment.

Announces New Process For Welding Steel Pipe

A new welding process for the production of steel pipe, called "welded-seamless tubing," was announced in Pittsburgh recently by Howard J. Burnish, an electrochemist, formerly associated with the A. O. Smith Corp., Milwaukee. Mr. Burnish has been working on the new method for over three years and reports that cheaper production, longer life and greater strength, due to freedom from electrolytic corrosive tendencies, result from the process. Details of the method have not yet been disclosed.



Design details, including columns, walls and floors, are presented in this sketch. Also shown are the radiant walls, unified air control and the hot well which combines all heat uses



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The Plastic Forming Of Metals

By PROFESSOR DR.-ING ERICH SIEBEL
Translated by JOHN H. HITCHCOCK

Part III—Investigations of Distribution of Deformation and Stress in Technical Forming Processes

2. Distribution of Deformation and Stress in Drawing, Pressing and Piercing (Continued)

DEFORMATION during drawing occurs by means of elongation with practically equal flow from all sides in the transverse direction. If the position of the die in the region of deformation is indicated, it then is evident that the central stream tubes IV, V, and VI already have been vastly deformed before their entrance into the die. The principal deformation of the outer stream tube I, on the other hand, begins only when this tube touches the wall of the die. Because the greater deformation of the central parts ahead of the die results in a transverse contraction, however, contact with the wall of the die first occurs in the middle of the die. The angle of displacement, δ, in the individual stream tubes of a given cross section of material, grows with increasing deformation from the middle out to stream tube III, but decreases, on the contrary, in both outer stream tubes.

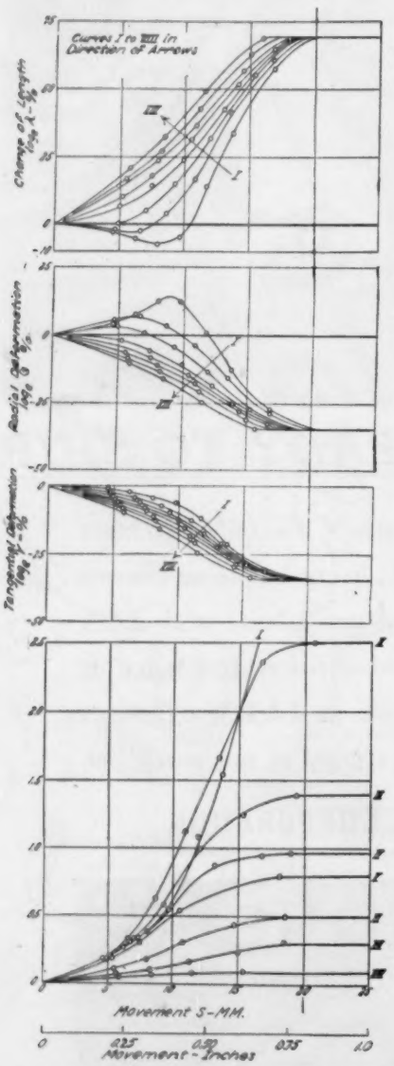


Fig. 141—Deformations and displacements in extrusion (see Fig. 131)

Deforms During Extrusion

The extrusion test with a 50 per cent reduction of area, illustrated in Fig. 131, is evaluated in the same way in Fig. 141. As v. Obermayer[3] and Unkel[40] already have established, the material first begins to be deformed plastically during extrusion at a certain distance ahead of the outlet die. Because of the fact that dies having an opening angle of 180 degrees are used for extrusion, so-called "dead corners" are formed ahead of the die. The material in these corners undergoes no deformation whatever, because here uniform pressure is exerted from all sides (see Figs. 131 to 133). The deformation in the inner stream tubes VIII to VI resembles closely that of the drawing test previously described. These parts are elongated, with flow of material from all sides, with almost uniform rapidity. The material in the outer stream tubes I and II, however, because of the shape of the die, first is compressed in the longitudinal direction and elongated radially, whereas no appreciable deformation occurs in the tangential direction. The compression in the edge region then increases as the process continues, while in the inner zones newer particles of material participate in the elongation. Because of this fact, the differences in the deformation movement, and therewith in the shear displacement as well, become greater and greater. By widening the stream tubes at the edge, the adjacent stream tubes simultaneously are displaced, and the particles of material lying here also reach the region of elongation one by one, as a result of this action.

Deformations in piercing (Fig. 142) are similar to those of extrusion. The deformation at the lower end of the mandrel is brought about

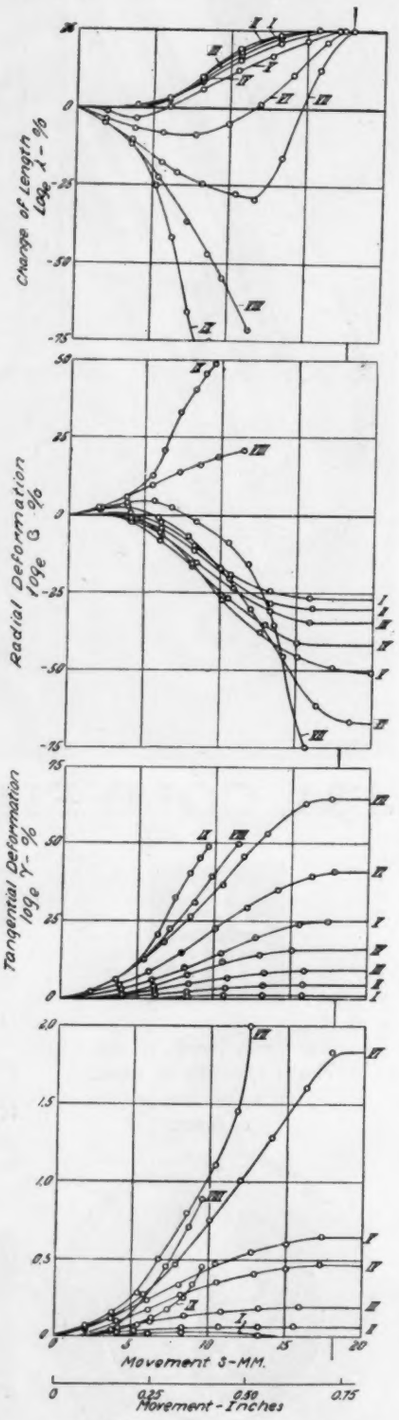


Fig. 142—Deformations and displacements in piercing (see Fig. 135)

ADVERTISING PAGES REMOVED

by compression in the inner stream tubes VII to IX, which produces an elongation of the material in the outer stream tubes I to III. The difference in elongation requires large shear displacements, which reach their highest values at the mandrel.

Further evaluation of the tests, for the determination of the total displacement of volume from the sum of the successive individual deformations in the stream tubes during the passage through the forming zone, is carried out only for the drawing test, for the reasons previously mentioned. From the curves of deformation normal to and in the direction of the stream lines, and of the magnitudes of the shear displacement tan δ, the differential quotients of these deformations; that is, the elongation (ϵ_1), the spreading (ϵ_2), and the shear displacement (ϑ), during a movement of 0.029-inch, first were determined for each stream tube. The behaviour of these quantities is indicated in the upper graphs of Fig. 143. From these values, the monetary angle of the principal direction of deformation with the stream line considered, according to equation (71), and the actual deformation (ϵ) for each unit (0.029-inch) of movement, according to equation (70), then could be calculated. These values for ϵ were plotted in Fig. 143 as a function of the movement, s. The areas between these curves and the axis of abscissas then were measured by planimeter, and the resulting total deformation in each stream tube thus was determined according to the values plotted in Fig. 143.

In the completely evaluated drawing test, the values of the actual deformation are not appreciably greater than those determined from the final condition. The average actual deformation amounts to 37.4 per cent, in comparison to an elongation of 32.2 per cent. The actual additional deformation, according to this method of calculation, amounts to 15.8 per cent of the elongation. The difference between these two values will be still smaller for drawing with small die angles and heavier reductions. The internal losses, which accompany forming in drawing, therefore are comparatively small.

The relations in extrusion and piercing are different. Because of the extraordinarily great shear displacements in the edge zone, the actual deformations in this case must be much larger than the elongation or the change of thickness. As a result of the fact that the direction of deformation changes greatly in the

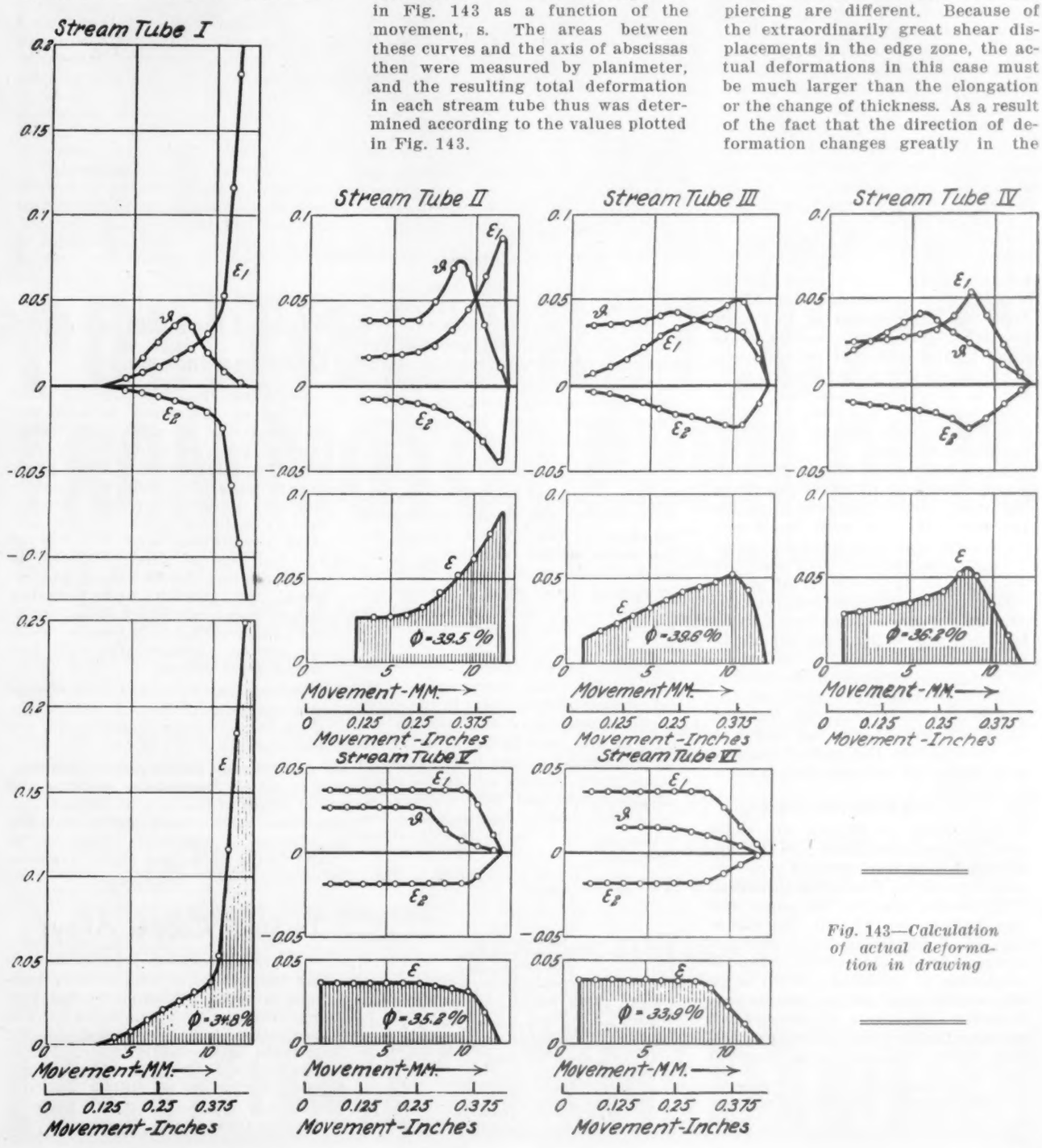


Fig. 143—Calculation of actual deformation in drawing

edge regions, the actual deformation in this method of forming exceeds by a considerable amount even the values determined from the final condition. The internal forming losses are correspondingly large.

Stress Directions Indicated

Much less difficult than the determination of the actual total deformation in the individual stream tubes is the determination of the deformation directions according to equation (71), and the drawing of the stress trajectories. The trajectory diagrams thus determined for drawing and extrusion tests are reproduced in Figs. 144 and 145. Calculated directions of principal stress are indicated by the positions of the crosses, through which the lines then were drawn. The third principal stress direction in each case is perpendicular to the plane of symmetry considered; so that the stress trajectories in this direction, since the processes investigated are symmetrical about an axis, correspond to concentric circles about the longitudinal axis of the body.

It follows from the illustrations that the condition of stress in the forming region in all processes investigated is comparable to an arch formation. By means of this arch formation, transverse pressure is exerted in the region of deformation, upon the effect of which the deformation is primarily dependent. This arch formation, however, is distributed differently in the individual forming processes.

In drawing, as shown in Fig. 144, a rather flat arch of transverse stress is formed, in which a most extensive agreement is given with the stress-trajectory diagrams determined by F. C. Thompson and I Barton[*], by photoelastic investigation of purely elastic stress in various drawing dies. The trajectories of transverse stress intersect the wall of the die at an angle to the normal, the magnitude of which corresponds to the friction angle. Because the crown of the stress arch in the entering material extends backward, the bar begins to be deformed in the central portion, even before its entrance into the die.

Die Angle Is Important

The effects of varying die angle and frictional relations can be understood from the described arch formation without further explanation. The smaller are the die angle and the friction in the die, the flatter the transverse stress trajectories become, and the more uniformly the deformation is produced. With large die angles and proper lubrication, however, the region of deformation extends far into the entering material, which condition must lead to

[*] F. C. Thompson and I. Barton: Studies of the Wire-Drawing Process; Carnegie Schol. Mem.(1930)p. 39/78.

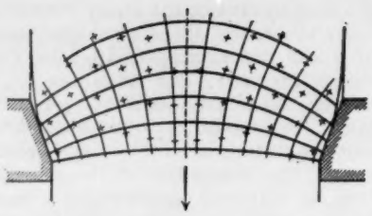


Fig. 144—Course of stress trajectories in drawing

differing degrees of deformation in edge and central zones, and to corresponding additional shear displacements. A highly arched distribution of the transverse stress trajectories, moreover, results in a pronounced convergence of the longitudinal stress trajectories toward the center, which is accomplished by a nonuniform distribution of the longitudinal stresses in the die exit. An increased tensile stress in the longitudinal direction then occurs in the central zone at this point, which can cause the separations of material known as "over-drawing" in the core of the delivered bar.

Arch Is More Severe

A comparison of the stress trajectories in drawing (Fig. 144) and in extrusion (Fig. 145) shows that the transverse stress trajectories are arched much more severely in extrusion than in drawing. Because of the 180-degree opening angle of the die, the directions of the highest principal stresses in the outer zones of that part of the compressed body which lies in the die are approximately parallel to the wall of the die. Inasmuch as the stress trajectories converge in the corners formed by the walls of the container and the plate containing the outlet, a region is formed here which is subjected to pressure from all sides, and in which no deformations occur (see Figs. 131 to 133). Because of the described distribution of the stress trajectories, the deformation first takes place in the center; in the outer zones almost pure compression occurs at first, and in the inner zones, an elongation of the body elements takes place. Severe additional shear displacements and deformations, as were described in the preceding sections, are the result of this stress condition.

(To be continued)

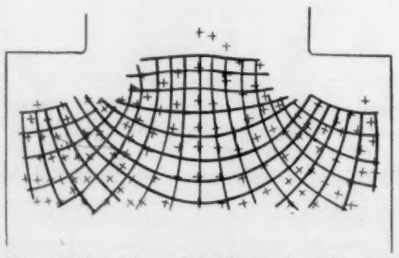


Fig. 145—Stress trajectories in extrusion

Bureau Studies Hardening Of Carbon Tool Steels

Steels of apparently identical chemical compositions sometimes behave very differently when hardened by quenching. These rather mysterious differences are extremely disturbing in the hardening of carbon tool steels, for one steel may harden completely throughout and thus produce a brittle though hard core, while another steel of the same composition may harden fully only at the surface and thus produce a tough core. This difference has been given various names, such as "body" or "timber."

A detailed study of the subject is being made in the metallurgy division of the bureau of standards, Washington. Recently quantitative determinations have been made of the cooling rates during quenching which are just sufficient to harden these steels. The differences in these critical cooling rates and in the manner in which these critical rates change as the conditions of heat treatment of the steels are changed, are the causes of the differences in "body" or "timber" of carbon steel.

Welded Pipe Fittings Are Described in Catalog

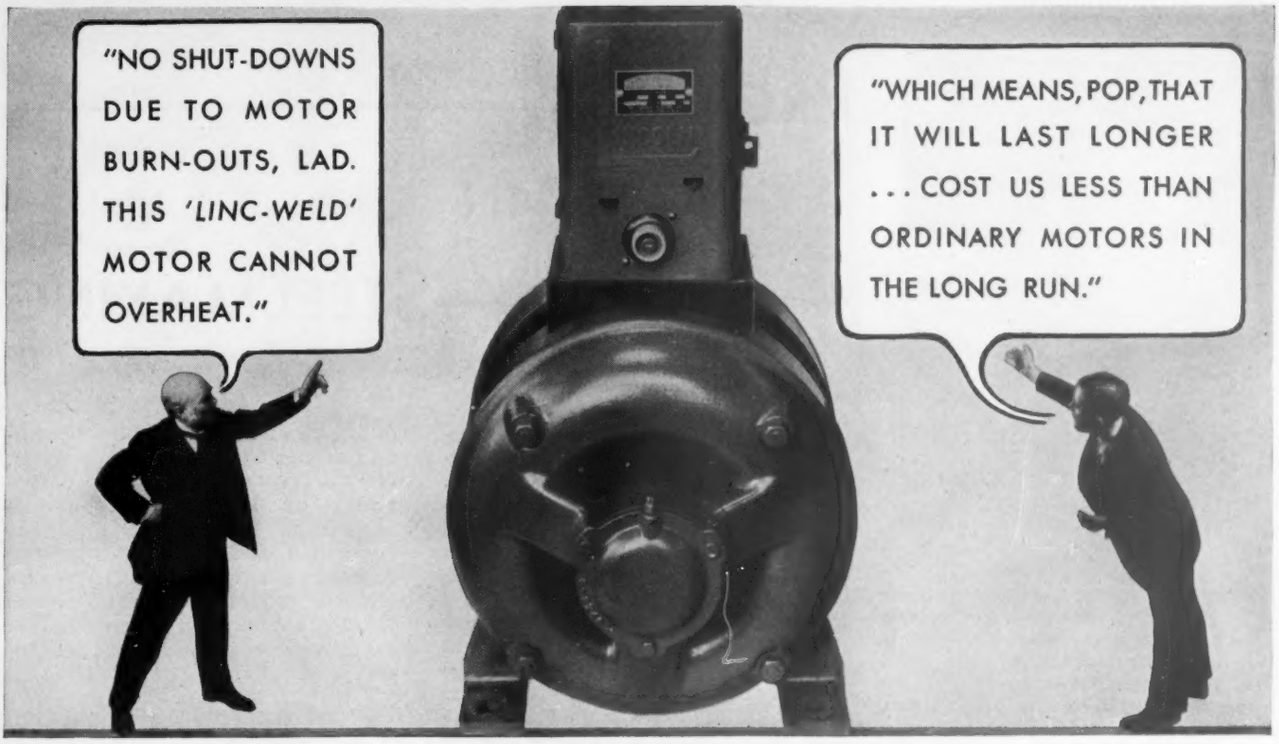
Seamless steel fittings for pipe welding are described at considerable length in an attractive 64-page catalog just published by Taylor Forge & Pipe Works, P. O. Box 485, Chicago, for many years interested in problems of pipe fabrication by welding. The booklet contains illustrations and sketches of the full line of products, such as elbows, return bends, socket end elbows, full branch and reducing branch tees, reducing nipples, welding caps, welding neck flanges, welding sleeves, vanstone stub ends and forged steel flanges.

Advantages of welded steel fittings and the adaptability of welded fittings to particular requirements are emphasized.

Convenient tables present information as to dimensions, weights and list prices of the various fittings. One section of the book deals with engineering calculations involved in the design of welded piping systems.

To Study Copper Alloys

Research looking toward improving the quality of copper alloy castings is being sponsored by the Falcon Bronze Co., Youngstown, O. The project will be conducted at the Battelle Memorial institute, Columbus, O., according to an announcement by Dr. H. W. Gillett, director, who has designated C. H. Lorig to take charge of the program.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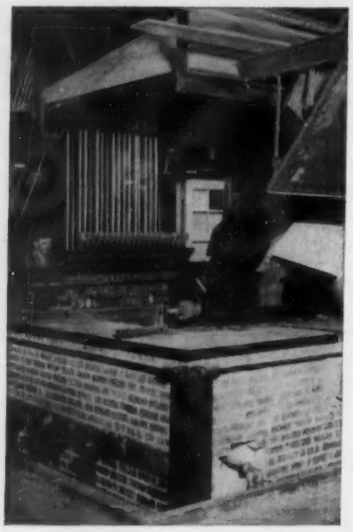


ONE by-product coke oven operator was faced recently with a peculiar buckling in one of its oven stacks. The stack had bent to a dangerous angle, apparently caused by the brick lining being shifted. It was found that a lime-tempered mortar used to bind the stack's bricks, had, because the stack itself was not properly insulated, become dried out and the bricks had shifted.

♦ ♦ ♦

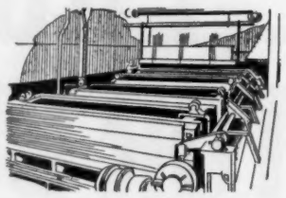
Introduction of steel sheets having an unusual, but for the time being undisclosed manganese content, is being planned by a large steel sheet producer. Exhaustive tests have been made on this new type of sheet, which is said to be both extremely hard yet lighter in weight than ordinary grades. Use of this new sheet undoubtedly will be made in applications where aluminum now is being employed.

♦ ♦ ♦

Diffusion flame combustion now has been devised for furnaces used in the forging industry. As a result of this type heating a new standard of efficiency has arisen. The work is heated to the forging temperature at a fast rate, no sparks fly as the work is being shaped under the hammer and the surface of the steel is not pitted with the result that the life of the shaping and forming dies is prolonged.

♦ ♦ ♦

Endless chains on which are mounted half oval slats features a continuous hold-down slitting shear recently placed on the market. A yielding track under spring pressure urges the slats of the upper and lower unit toward each other, thereby holding the sheet firmly as it is being fed to the slitting rolls. Provision is made so that the axes of the cutter shafts always are parallel. Cutter arbors rotate in antifriction bearings mounted in eccentric sleeves to facilitate adjustments. Operating in conjunction with the shear is a scrap cutter which consists of four rotating blades which sever the strip as it passes along over an anvil roller. When a crank handle on the shaft extension at the side of the machine is actuated, the surface of the anvil roller is presented nearer to the cutting edges of the blades. Adjustment of one one-thousandth-inch is possible, and can be made while the machine is in operation.



SODIUM silicate cement, which is resistant to all strengths and temperatures of hot and cold acids except hydrofluoric, has been introduced for pickling tanks and pickling department floors. The material is quick-setting and self-hardening, taking an initial set at 70 degrees Fahr. in 20 to 25 minutes after mixing the powder with a solution of sodium silicate. After three days at this temperature, the cement is ready for use without further treatment. Compressive strength of the material is approximately 2400 pounds and the tensile strength 350 pounds per square inch. It adheres to brick, stoneware, iron, steel, lead, wood and glass.

♦ ♦ ♦

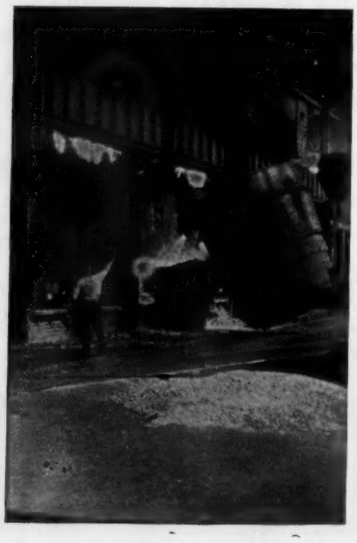
Application of antifriction bearings on mine locomotive motors operated by a southern ironmaker not only has effected savings in power, increased bearing life and a reduction in lubricating costs, but has lowered maintenance costs of the motors. Leakage of oil on the commutator caused sparking and deterioration of the bars and brushes oil on the windings resulted in the deterioration of the insulation. Use of antifriction bearings, however, has eliminated these difficulties. Intervals between overhauling have been increased 50 per cent. The cost of lubrication has been lowered 75 per cent, according to officials of the company.

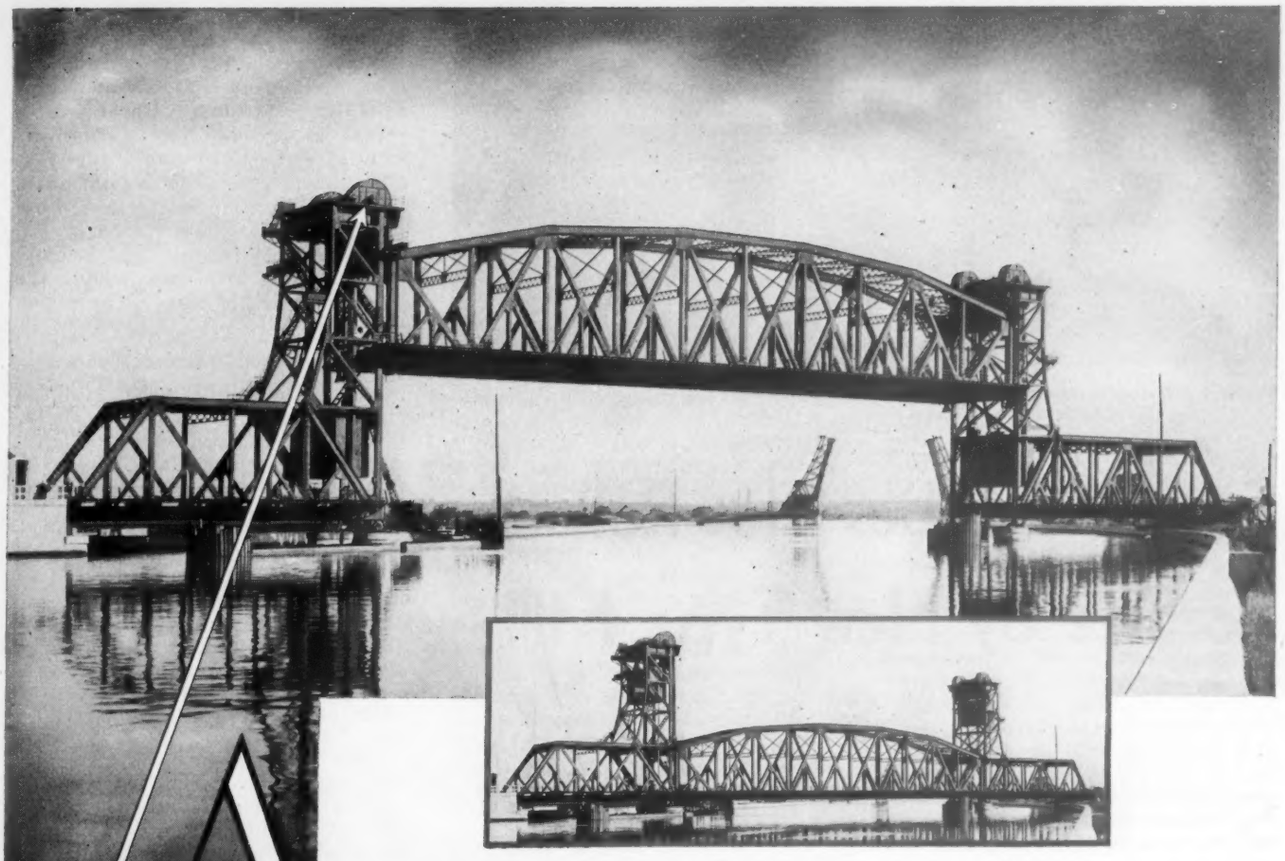
♦ ♦ ♦

Confirmation of the tentative value of 0.0025 for the product of the concentrations of carbon and oxygen coexisting in liquid iron at 2912 degrees Fahr. and in equilibrium with carbon oxides at 1 atmosphere pressure, recently was made by the bureau of standards.

♦ ♦ ♦

Approximately one-half second is required to reverse the chains of sheet mill feeder and catcher tables from full speed in one direction to the operating speed in the opposite direction without causing undue slippage between the packs and the chain, according to recent tests.





A HIGH LIFT on a LONG SPAN

One of four 13-foot sheaves, weighing 37 tons each, mounted two on each tower of the Rock Island Bridge. Each sheave is grooved for sixteen 2¼inch cables, which have one end attached to the lift span, the other to the counterweight. Power for turning the sheaves is applied directly to the ring gear, at one side of the sheave, by motor-driven shafting.

OVER the Des Plaines River and the adjacent Illinois and Michigan Canal at Joliet, Ill., was a six-span fixed bridge carrying the double-track main line of the Rock Island Railroad. Navigation plans for the proposed Illinois Waterway required raising the grade of the bridge 12½ feet and replacing the former six spans with three, the middle one, approximately 300 feet in length, to be a lift span that should provide, for the present, when raised, 59½ feet head-room for vessels. A possible requirement for future navigation of 109½ feet clearance necessitated provisions in the design for a future 50-foot extension of the towers, to be obtained by raising the present three panels of each tower and inserting under them two new 25 foot panels, seated on the fixed trusses.

The towers are an integral part of the fixed spans; and on them are mounted the cable sheaves, 13 feet in diameter, also the operating machinery for raising and lowering the middle span, which weighs over 1,000 tons. All these changes were accomplished without interruption of the heavy traffic on the bridge. The design and reconstruction were directed by the engineers of the Rock Island Lines. The Herlihy Mid-Continent Company of Chicago were the general contractors. The structural steel, machinery, and electrical apparatus were furnished by American Bridge Company.

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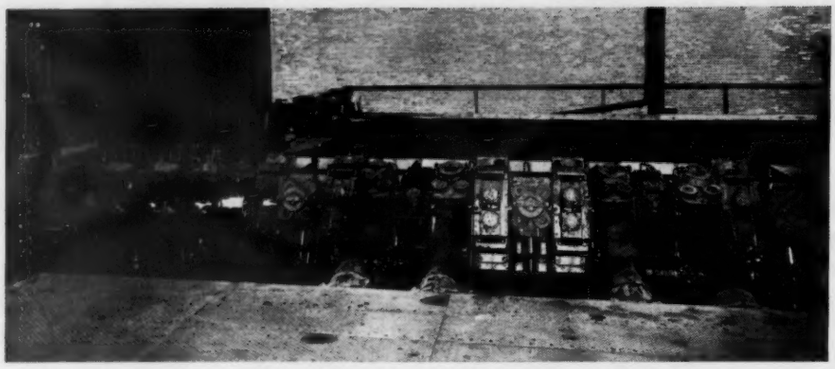


Pierced billet entering first stands of the high-speed tube rolling mill. The mill has 21 stands. The control station is shown in the background

Seamless Tubes Hot Rolled To Size by New Type Mill

By W. G. Gude
Associate Editor, STEEL

SEAMLESS tubes having improved characteristics, compared with the product of the plug mill, now are being produced in this country on a new type of high-speed mill. The principal feature of this process is that the pierced billet is hot rolled over a long, solid bar in a continuous, close-coupled rolling mill rather than drawn over a stationary plug in a 2-high mill. The new mill, known as the Foren type, has been placed in commercial operation in the plant of the Globe Steel Tubes Co., Milwaukee, this company controlling the patents.

Numerous advantages are claimed for the process and its product. All sizes of tubes may be finished by hot rolling. This is of interest, because at present the smaller diameter tubes are produced by cold drawing which involves additional operations such as pointing, annealing, pickling and straightening.

Grain Structure Uniformly Fine

Improvement in both grain structure and in surface quality is effected. Pressure of the rolls on the outside of the tube against the solid bar provides a kneading and pressing action which effects a substantial reduction of cross-sectional area without causing fine scratches commonly present on the inside of the tube after it is drawn over a fixed plug. Being worked quickly, the tube is finished at metallurgically correct temperatures. The grain structure is uniformly fine, as indicated in the accompanying photomicrograph of a specimen obtained from the new mill, compared with equal magnification of the plug mill product.

Eccentricity is said to be greatly minimized by the Foren-type mill. While a certain amount of eccentricity results from the piercing operation, this is corrected in the subsequent rolling.

Limitations previously existing on lengths of tubes that can be produced have been removed by this equipment. Practically any length can be rolled.

Rolling Is Important Operation

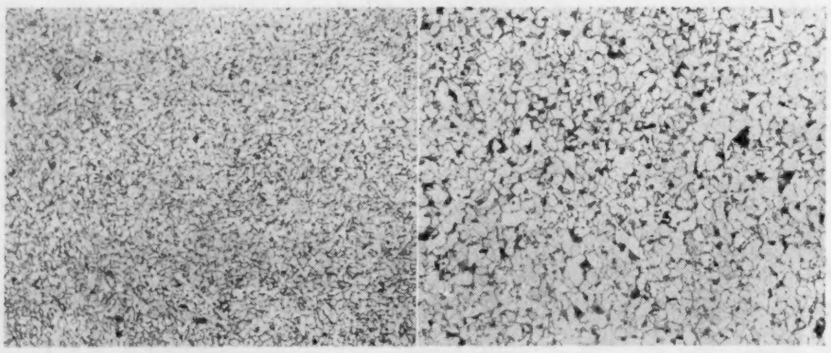
While the rolling mill itself is only one unit of the equipment required to transform the billet into a finished tube, it is the vital point in the production line. The billets are heated in an oil-fired furnace and after passing through a piercing mill, are transferred by a mechanical arm into position for rolling. Before a billet is served to the mill proper, however, a mandrel is inserted in the center of the pierced blank. This mandrel is made of alloy steel, ground and hardened, and traveling with the tube, serves as a solid base during the rolling of the billet into a tube. It is sufficiently long to accommodate the finished length of the tube. Both billet and bar pass through five stands of squeezer rolls just prior to entering the first mill stand, the operation at this point compressing the steel tightly around the mandrel.

More Rolls Contact Tube

The rolling mill consists of 21 stands, each individually motor-driven and synchronized by electrical control to accommodate the variations in speed resulting from the reduction in tube diameter and, at the same time, to prevent any slack from developing in the work between adjacent rolls. Pairs of rolls are located at 22.5 degrees on each side of the horizontal and vertical planes, thereby giving a centerline of working contact for every 45 degrees of the tube circumference, instead of every 90 degrees as in ordinary practice.

This arrangement permits an actual working contact by each roll of only about one-half the length of contact common for existing equipment, and, since no working point of the roll-groove is more than 45 degrees distant from the center of the groove, speed inter-relations between different points on the working contact of the groove are claimed to be superior to those obtained with roll-pairs disposed at only 90 degrees to each other. In addition to a better working condition, this, it is stated, results in less wear on the rolls and a considerable saving in power due to the elimination of excessive slippage and consequent friction between the rolls and the material being rolled.

Production is at high speed, the mill easily turning out six tubes, 40-feet long, per minute, compared with an average of 2½ tubes per minute on the plug mill operated in this plant. The maximum outlet speed of the mill is about 17 feet per second.



Typical microstructures of low-carbon, hot-finished seamless tubing at 100 diameters. The product of the Foren mill is shown at the left and the plug mill at the right

From billet to tube requires one minute, the rolling operation alone for a 40-foot tube taking only 6 seconds. The rest of the time is required by the piercer, reducing machines and conveyors.

After the tube has received its final reduction in the mill, it continues toward the cooling bed. Without interrupting the tube's travel, a set of jaws grips the mandrel at the rear end and holds it while three sets of pinch rolls strip the tube from the bar and move it toward the rear of the mill. As the tube continues to move it actuates a switch that releases the jaw's hold on the bar, and another switch operates a mechanism to kick the bar into a water bath.

After cooling, the bar is removed by a chain drive and is conveyed automatically to its starting position to be used again. Before reaching the cooling bed, the tube travels through one or two continuous reducing mills where the smaller finished diameters are produced without reheating.

Produces Gages of Wide Range

While this mill is designed to produce tubes 4 inches and less in outside diameter, its principle is adaptable to equipment for the manufacture of larger sizes. Gages as light as 18 have been rolled, although there is practically no limitation in this respect, it is stated. Hot-rolling on other types of mills usually has been limited to around 12-gage.

To change the gage being rolled on the Foren mill requires only about 5 minutes; more time is needed to alter the diameter setting. Alloy steels as well as nonferrous metals have been rolled satisfactorily on this equipment, while tubes of various analyses of stainless steel, including some which it has been impossible to draw to the lighter gage, also have been produced in this new mill.

Study of Brass Ingots Codifies Casting Practice

Casting of Brass Ingots, by R. Genders and G. L. Bailey, cloth, 191 pages, 6 x 10 inches; published by the British Non-Ferrous Metals Research association, London, and supplied by STEEL, Cleveland; and in Europe by Penton Publishing Co., Ltd., Caxton House, Westminster, London.

Interesting and valuable data in summarized form of results of the research on brass ingot casting, which has been carried out by the British Non-Ferrous Metals Research association over a period of years, are presented in this volume, the third in a series of research monographs published by the association.

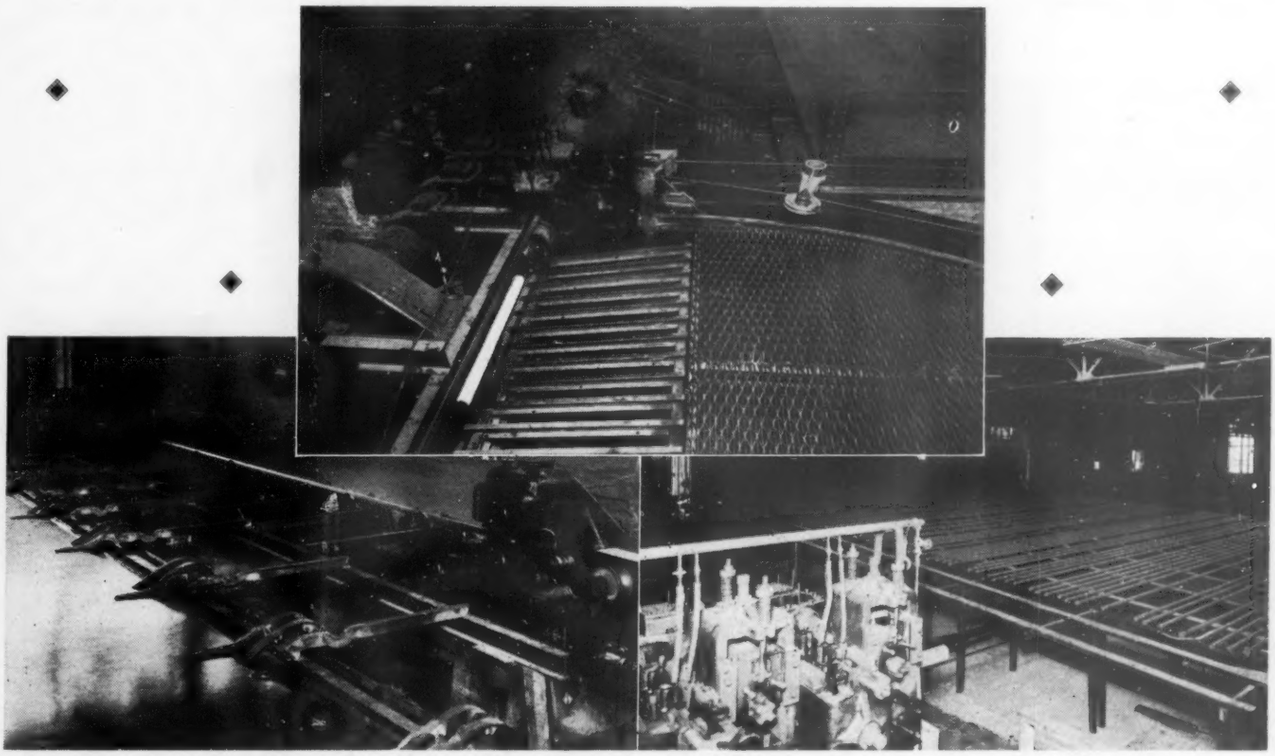
The researches on brass ingots were directed primarily toward obtaining understanding of factors involved in the casting process, and their influence on soundness and surface quality. The book opens with a historical chapter and a description of commercial practice, followed by a detailed account of characteristics of brass ingots and rolled strips, and of causes of main types of defects. The main portion is devoted to discussion of factors influencing quality.

The authors believe that the ultimate value of the book and of the work which underlies it is not confined to the practice of brass casting, since the principles which have been established are in many cases equally applicable to the casting of other metals. The book should be of considerable value to those interested directly or indirectly in nonferrous and metallurgical practice.

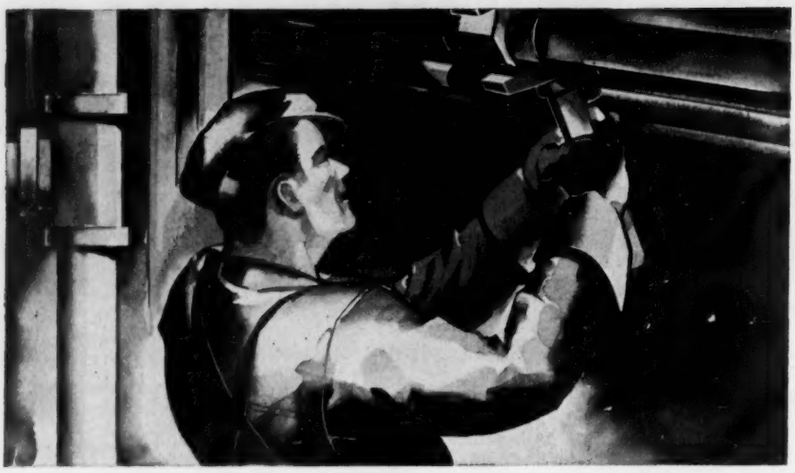
Railway Cars Pioneer New Fields for Stainless

(*Concluded from Page* 26)

help to make engineers and manufacturers weight conscious. Up until now, weight and strength have been synonyms used indiscriminately by many people. The demonstrations we have made will clarify the engineering mind on this point, making plain that in most cases weight and strength are enemies not allies and that while strength is always an ally of economy, weight is almost always an enemy. The development of this new art has been hastened by the period of depression, as have many other powerful contributions to our industries; it promises to do its part toward relieving business stagnation.

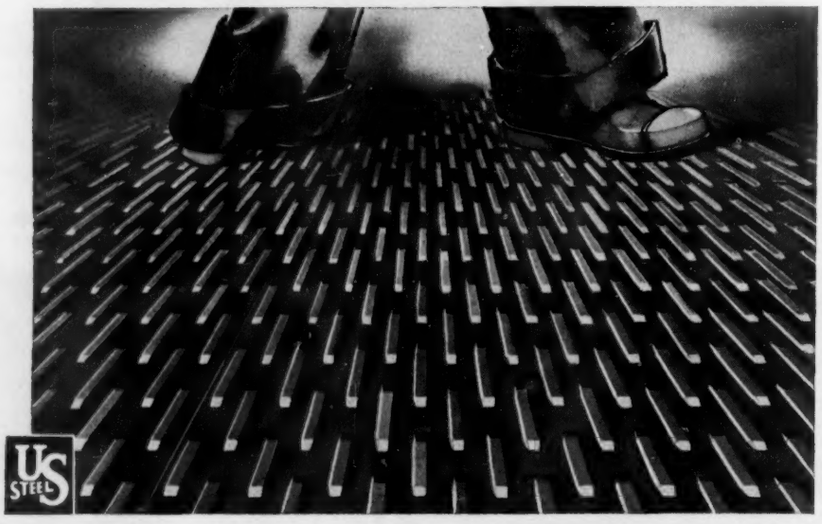


Preparatory to rolling, a solid steel bar is inserted in the pierced billet as shown in the illustration at the lower left. When rolling is completed, a grabber shown at the right in the upper center illustration holds the bar as the tube is stripped from it. The bar then is kicked into the water bath for cooling before being used again. Finished tubes are cooled on the large cooling bed shown in the view at the lower right



HIS MIND IS ON HIS WORK
••*not on his* FOOTING

A safe footing is necessary to good workmanship. Where floors are hazardous, the spectre of possible accident and loss of income robs the workman of efficiency—slows his speed, renders his movements less sure, makes impossible his undivided attention to his task. Statistics of the National Safety Council indicate that approximately one-sixth of industrial accidents are caused by falls, a large percentage of which could be prevented by proper floor protection. Carnegie Floor Plate provides an excellent safeguard for industrial flooring, stair treads, elevated platforms and many other places where a safe footing is necessary. Carnegie Floor Plate drains and cleans easily. It is rolled in a variety of widths and thicknesses. Its use is an investment which pays high dividends in efficiency and safety. Inquiries are invited.



CARNEGIE FLOOR PLATE

CARNEGIE STEEL COMPANY

Subsidiary of United States Steel Corporation

PITTSBURGH • PENNSYLVANIA 251

NEW EQUIPMENT

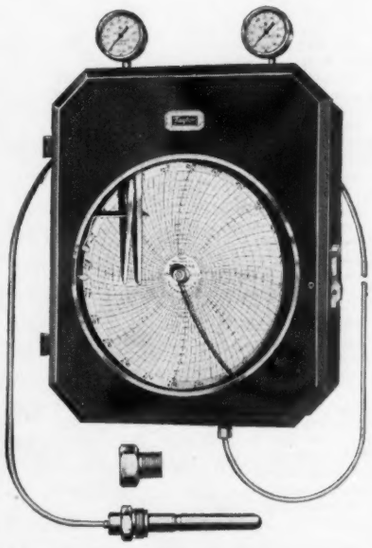
PRODUCTION FABRICATION
TREATMENT FINISHING

Centrifugal Acid Pumps—U. S. Stoneware Co., 50 Church street, New York, is building a line of armoured centrifugal acid pumps. The casing, impeller and all parts coming in contact with corrosive solutions are made of chemical stoneware. A double packing gland prevents spraying. All stoneware parts are ground into the protecting armour and corrosion resisting alloys are employed for metal parts that may be attacked by fumes of highly volatile liquids. Impeller clearances are adjustable. Accessibility permits rapid removal of any wearing part.

♦ ♦ ♦

Recording Regulators—Taylor Instrument Cos., Rochester, N. Y., is introducing a new line of air-operated recording regulators that incorporate a full range sliding adjustment by which the regulator performance can be balanced for any degree of apparatus time lag. The units, shown herewith, are designed to control temperature, rate of flow, pressure or liquid level. A simple screw driver adjustment on a graduated scale gives throttling or on-and-off diaphragm valve action, whichever provides the desired type of control. The regulator mechanisms and means of adjustment of all regulators in this line are the same whether for controlling temperature, pressure, rate of flow or liquid level. They differ only in their means of regulation.

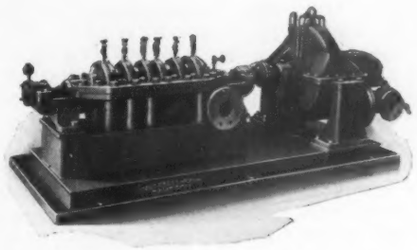
Control is maintained in the conventional manner by regulating the flow of air pressure to the diaphragm valve in the controlling medium line in response to changes in apparatus under control. Regulators action can be converted quickly from direct to reverse or vice versa without the addition or subtraction of parts. An electric chart-driving mechanism is standard equipment.



Taylor recording regulator for temperature, pressure, etc.

♦ ♦ ♦

Boiler Feed Pumps—Ingersoll-Rand Co., 11 Broadway, New York, is marketing new pumps particularly suitable for boiler feed, oil refinery service, mine drainage, water supply systems and general hydraulic work for pressures up to approximately 600 pounds per square inch. The units are single suction, opposed impeller, diffusorless, multistage design and are built in either four or six stages as shown above.



Centrifugal boiler feed pump built by Ingersoll-Rand Co.

♦ ♦ ♦

Heavy-Duty Condenser—DeVilbiss Co., Toledo, O., is announcing an improved condenser. With this unit, oil and water are removed effectively from air by a baffle arrangement inside. No cotton or other waste is employed in the filter. Air passes down through a pipe to the condensing chamber, at which point special construction features cause precipitation of moisture and oil to the bottom of the condenser where it may be drained.

♦ ♦ ♦

Circuit Breaker Panels—General Electric Co., Schenectady, N. Y., recently placed on the market self-supporting steel panels for mounting small oil circuit breakers for isolated installations. The equipment is suitable for use on ungrounded systems up to 2500 volts. The oil circuit breaker interrupting ratings are 20,000 to 50,000 kilovolt amperes. The equipment consists of an isolated flanged steel panel, to which supporting feet have been welded, so that the panel when fastened to the floor becomes a self-supporting structure. In addition to the breaker and its operating lever, accessory apparatus such as current transformers, relays, etc., can be mounted on the panel.

♦ ♦ ♦

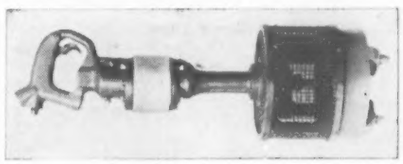
Light Sensitive Device—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently developed a device known as the Photo-troller, especially adapted to industrial light sensitive applications requiring operation on low light intensity. The indoor model operates on three foot-candles with the phototube extended at distances up to 10 feet. The unit combined with standard light sources will cover up to 50 foot throw.

♦ ♦ ♦

Nut Runner—Buckeye Portable Tool Co., Dayton, O., recently placed on the market a shockless high-frequency electric nut runner. An adjustable releasing clutch operating on a new principle, is a feature of the unit. It has an adjustable releasing cam which trips open the clutch when the nut is tight. A number of sizes are available.

♦ ♦ ♦

External Tube-End Polisher—Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, recently developed a rotary-driven pneumatic tool which has many advantages over the hand method of filing boiler tubes. Stacking the tubes with about 3 inches space between each allows the polisher to be entered on the tubes to clean them without additional handling. When the corborundum is worn to the holder two bolts in the clamp are loosened and the abrasive moved in toward the tube about ¼ inch. The unit, shown in the accompanying illustration, requires no attention except the oiling of the motor, it is claimed. Operation is entirely automatic.



External tube-end polisher made by Chicago Pneumatic Tool Co.

Exports Continue Decline But Far Exceed 1933 Rate

AFTER a fairly consistent rise from the low point of July, 1933, to a high in December, exports of steel and iron products have declined two successive months, from 184,585 tons in December to 178,023 tons in January and 151,184 tons in February, according to compilations of the iron and steel division, department of commerce.

The total for February was 26,839 tons less than in January, a decline of 15.1 per cent. However, February of this year showed exports 136.6 per cent greater than in February, 1933, while imports rose 12.1 per cent from the low figure of January to 25,407 tons in February.

For the first two months of 1934 exports were 329,207 tons, which is 173 per cent higher than the total for the first two months of 1933. Imports, at 48,060 tons for two months, are 16.3 per cent greater than the comparable months in 1933.

The February decline resulted from losses in 32 classes of material, while only 28 showed gains, the latter all small. Scrap fell off 11,388 tons, to 75,884 tons in February. Other decreases of moment were in wire rods, 5821 tons; tin plate, 4606 tons; seamless casing and oil line pipe, 1914 tons; heavy rails, 1223 tons; rail joints, 1158 tons.

Scrap was the largest single item of export in spite of a loss of 25 per cent from the record shipments of December, 1933. The total of 75,884 tons of scrap included 65,113 tons to Japan, 4001 tons to the United Kingdom, 2466 to Italy and 1065 tons to Germany. Tin plate exports of 16,512 tons were second largest. Japan took 2637 tons, China 2497 tons and the Philippines 1494 tons. Steel rail exports were 10,648 tons, of which Brazil took 8840 tons. Canada took 2015 tons of the 4912 tons of black sheets exported in February. Mexico took 690 tons of black sheets, China 494 tons and France 411 tons. Galvanized steel sheets were fifth in importance, shipped widely. Of this product 4263 tons were exported, 1382 tons going to the Philippines, 555 tons to Brazil, 517 tons to Mexico and 404 tons to Colombia.

Changes in tonnages of imports were not important. Pig iron imports droped from 11,886 tons in January to 10,777 tons in February. Of this 5001 tons came from the Netherlands and 4753 from British India. Ferromanganese increased from 1413 tons in January to 2720 tons in February, 1511 tons coming from Canada. Structural shapes increased from 1030 tons in January to 1523 tons in February, 893 tons coming from Belgium.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1934		1933	
	Imports	Exports	Imports	Exports
Jan.	22,653	178,023	21,892	56,720
Feb.	25,407	151,184	19,748	63,936
2 mo.	48,060	329,207	41,343	120,605
Mar.	.....	.....	22,114	80,567
April	.....	.....	28,061	100,395
May	.....	.....	26,295	123,069
June	.....	.....	34,368	102,581
July	.....	.....	52,805	83,311
Aug	.....	.....	46,839	119,374
Sept.	.....	.....	55,706	108,799
Oct.	.....	.....	46,673	164,755
Nov.	.....	.....	28,979	157,600
Dec.	.....	.....	31,310	184,585
Total	.....	.....	414,790	1,350,692

ORIGIN OF FEBRUARY IMPORTS

Gross Tons

	Pig iron	Manganese ore	Ferromanganese
Netherlands	5,001	.....	.....
Kwantung	232	.....	.....
United Kingdom	50	.....	80
Canada	716	.....	1,511
Chile	25	.....	.....
British India	4,753	535	.....
Soviet Russia in Europe	.....	802	.....
Gold Coast	.....	780	.....
Norway	.....	.....	978
Italy	.....	.....	2
Poland	.....	.....	158
Total	10,777	2,117	2,729

	Sheets, skelp and sawplates	Structural shapes	Steel bars	Hoops and bands
United Kingdom	49	1	39	14
Belgium	221	893	421	471
France	60	575	505	187
Germany	9	54	49	366
Sweden	2	.....	230	.....
Japan	7	.....	.....	.....
Canada	.....	.....	2	.....
Austria	.....	.....	8	.....
Netherlands	.....	.....	.....	2
Total	348	1,523	1,254	1,040

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	Feb., 1934	Jan., 1934	Feb., 1933
Pig iron	10,777	11,886	8,382
Sponge iron	28	45	53
Ferromanganese, spiegeleisen	2,729	1,413	875
Ferrochrome	17	1	.....
Ferrosilicon	28	35	.....
Other ferroalloys	.....	.....	.....
Scrap	4,343	1,160	238
Steel ingots, blooms, etc.	67	54	53
Concrete bars	229	46	182
Hollow bar, drill steel	48	61	74
Merchant steel bars	1,254	1,033	1,812
Iron slabs	.....	 1	.....
Iron bars	26	46	21
Wire rods	864	747	918
Boiler and other plate	6	17	11
Sheets, skelp, saw plate	348	488	1,042
Tin plate	2	3	20
Structural shapes	1,523	1,030	1,597
Sheet piling	.....	.....	.....
Rails and fastenings	186	190	78
Cast iron pipe, fittings	1	2	.....
Welded pipe	221	255	353
Other pipe	279	527	61
Barbed wire	347	1,549	1,100
Round iron, steel wire	147	258	173
Telegraph, telephone wire	.....	1	.....
Flat wire, strip steel	184	49	60
Wire rope, strand	103	145	137
Other wire	64	2	63
Hoops and bands	1,040	823	1,751
Nails, tacks, staples	414	605	558
Bolts, nuts, rivets	25	28	21
Horse and mule shoes	10	26	24
Castings and forgings	97	127	91
Total	25,407	22,653	19,748

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	Feb., 1934	Jan., 1934	Feb., 1933
Pig iron	326	326	192
Ferromanganese, spiegeleisen	6	.....	.....
Iron and steel scrap	75,884	87,272	38,141
Ingots, blooms, billets, slabs and sheet bars	679	455	4
Bars, iron	58	112	21
Bars, steel	3,348	3,316	1,390
Bars, alloy steel	163	388	45
Wire rods	1,190	7,011	2,035
Boiler plate	78	29	89
Other plate, not fabricated	2,689	2,016	428
Skelp, iron or steel	817	819	238
Iron, sheets, galvanized	81	107	34
Steel sheets, galvanized	4,263	4,816	1,539
Steel sheet, black	4,912	5,748	1,961
Iron sheets, black	157	142	154
Strip steel, cold rolled	892	1,641	473
Hoop, band and scroll iron or steel	992	1,260	959
Tin, terne plate	16,512	21,118	2,905
Water, oil, gas and other tanks, except lined	1,648	480	24
Shapes, not fabricated	1,505	1,143	556
Shapes, fabricated	1,047	1,886	365
Plates, fabricated	237	442	13
Metal lath	86	126	101
Frames, sashes and sheet piling	417	198	446
Rails, 50 pound	10,648	11,871	670
Rails, under 50 pounds	463	396	89
Rail fastenings	1,654	2,812	23
Switches, frogs, crossings	98	93	16
Railroad spikes	631	679	73
Railroad bolts, nuts	332	248	44
Boiler tubes, seamless	485	481	519
Boiler tubes, welded	69	17	27
Casing and oil-line pipe, seamless	2,967	4,881	3,393
Casing and oil-line pipe, welded	596	693	67
Seamless black pipe, other than casing	167	212	20
Malleable iron screwed pipe fittings	238	335	104
Cast iron screwed pipe fittings	174	173	63
Cast iron pressure pipe and fittings for	628	751	216
Cast iron soil pipe and fittings for	591	166	116
Welded black steel pipe	1,105	1,690	708
Welded black wrought iron pipe	86	58	26
Welded galv. steel pipe	1,668	1,966	1,129
Welded galv. wrought iron pipe	137	86	15
Riveted iron or steel pipe and fittings	3	31	42
Plain iron or steel wire	836	1,146	254
Galvanized wire	2,538	2,372	246
Barbed wire	3,214	2,196	1,750
Woven-wire fencing	110	139	25
Woven-wire screen cloth	59	36	28
Wire rope	120	284	84
Other wire and manufactures	313	470	140
Wire nails	966	866	479
Horseshoe nails	67	65	51
Tacks	45	30	42
Other nails, staples	263	213	299
Bolts, machine screws	398	424	241
Iron castings	814	613	80
Steel castings	61	93	47
Car wheels and axles	391	306	429
Horseshoes	1	22	3
Iron and steel forgings, n.e.s.	261	258	224
Total	151,184	178,023	63,895

ADVERTISING PAGES REMOVED

Broad Price Rise Brings Heavy Contracting

Tonnage Booked 25% Over First Quarter—Raw Materials Share in Advance —Heavy Scrap Buying—Steel Rate Poised for Rise—March Ingot Output Up

STIMULATED by price advances ranging from $2 to $8 a ton effective this week for the second quarter, following the recent increase in iron and steel wages, commitments for steel last week rose to an unexpectedly high level.

Steelmakers estimate tonnage contracted for exceeds by 25 per cent that booked in the first quarter, and the heaviest of any second quarter since the beginning of the depression.

While it is difficult to appraise at this time the volume of consumption from the tonnage engaged, sellers have been restraining speculative buying at their expense, with the result they are convinced business actually reflects a much stronger demand. In this they are supported by the broad, miscellaneous coverage, as well as the increase in buying by the automotive industry and railroads. Anticipating their needs steelmakers have made heavy scrap purchases, recent sales being close to a half million tons.

With their retail markets still on the upgrade and production scheduled for further gains this month, automobile manufacturers are contracting for more than 500,000 tons of finished steel.

Railroads are releasing material for equipment recently awarded, and also covering their second quarter requirements. Building operations so far have failed to respond to seasonal influences. But it is believed that with a more clearly defined and rational policy toward capital at Washington, progress in the major consuming groups over the remainder of the first half will be irresistible.

Finished Steel Composite Back to Level of March, 1930; Wages on 1929 Basis

Steel price advances to become effective this week include: Sheets and strip $5 to $8 a ton; billets and slabs $3; sheet bars $4; plates, shapes, bars $3; plain wire $3; wire products $5 to $6; skelp $2, with an increase impending on pipe. Long ternes are up $8, but tin plate has not been advanced, and the future of the official $36.37½ price on rails which expires April 15 has not been decided.

On the basis of these adjustments, the effective dates of which range from April 12 to 15, STEEL's finished steel composite will be up $3.80 to $54.93, practically level with March, 1930, while iron and steel wages are back to 1929.

The upswing in prices also has spread to raw materials, pig iron raised $1 a ton; Connellsville coke, 35 cents a ton, and STEEL's scrap composite moving up 4 cents to $12.21.

Seldom have specifications followed so quickly on the placing of new contracts, users anxious to obtain all of their April quotas, presaging an increase in steelworks operations this week. Last week, however, the national average was off 1 point to 48 per cent. Detroit dropped 12 points to 88 per cent; Wheeling 7 to 62; Cleveland 5 to 67; Buffalo 2 to 50. New England rose 13 points to 82; Youngstown 1 point to 55; eastern Pennsylvania ½ to 35; while Pittsburgh held at 36, Chicago 48½, and Birmingham 52.

March Ingot Output Up 12.3 Per Cent; Pig Iron, 15.5; Exports Above 1933 Rate

Shape awards for the week dropped to 7424 tons, less than half the weekly average this year. An inquiry is expected shortly for 240 miles of gas line pipe for a company to supply the Detroit, Pontiac and Flint, Mich., district. New inquiry for railroad equipment includes 500 steel box cars for the Chicago & Great Western, while Lackawanna is about to place 500 freight cars.

The navy is opening bids on 500 tons of chrome-nickel steel sheets. Production of tin and terne plate in March rose 63,000 tons to 164,000 tons, highest for the month since 1931.

Steel ingot output last month averaged 103,600 gross tons, up 12.3 per cent, and total output for the month, 2,797,194 tons, compares with 2,213,569 tons for February. The first quarter's output, 7,007,660 tons, is more than double the 2,961,735 tons last year.

Daily average pig iron production last month was up 15.5 per cent to 52,438 gross tons; while total output, 1,625,588 tons, was 27.8 per cent above February. For the first quarter, 4,122,023 tons represents a gain of 147 per cent over last year. Ninety-seven stacks were in blast at the close of March, a net gain of seven.

February iron and steel exports amounted to 151,184 tons; imports, 25,407 tons. For the two months this year exports are 173 per cent higher than last year; imports, 16 per cent.

Pending adjustments in prices this week, STEEL's iron and steel composite remained $32.40, and the finished steel composite $51.10.

NOTE—Actual quotations and composite averages this week are not affected by the impending advances because they do not become effective until the latter part of this week. They will be reflected in the price tables in STEEL, issue of April 16. The majority of price changes were announced to become effective April 12. These include sheets and strip, up $5 to $8 a ton; plates, shapes and bars $3; plain wire $3; wire products $5 to $6; wire rods $2; sheet bars $4; billets and slabs $3; tin mill black plate $4; skelp $2. Sheet piling is advanced $3 effective April 16. Advances also are expected in concrete bars and pipe. Pig iron is up $1 a ton April 15. The official price of rails $36.37½ expires April 15, but last week no change was announced. Tin plate is unchanged, but No. 24 long ternes are up $8 a ton April 14.

COMPOSITE MARKET AVERAGES

	April 7	March 31	One Month Ago March, 1934	Three Months Ago Jan., 1934	One Year Ago April, 1933	Ten Years Ago April, 1924
Iron and Steel Composite	$32.40	$32.40	$32.40	$32.42	$28.16	$42.33
Finished Steel Composite	51.10	51.10	51.10	51.10	44.94	65.93
Steelworks Scrap Composite	12.21	12.17	12.30	11.24	7.23	14.58

A COMPARISON OF PRICES

	April 7, 1934	Mar. 1934	Jan. 1934	April 1933
Finished Material				
Steel bars, Pittsburgh	1.75	1.75	1.75	1.60
Steel bars, Chicago	1.80	1.80	1.80	1.70
Steel bars, Philadelphia	2.04	2.04	2.04	1.91
Iron bars, Terre Haute, Ind.	1.60	1.60	1.60	1.65
Shapes, Pittsburgh	1.70	1.70	1.70	1.60
Shapes, Philadelphia	1.90	1.90	1.90½	1.65
Shapes, Chicago	1.75	1.75	1.75	1.70
Tank plates, Pittsburgh	1.70	1.70	1.70	1.55
Tank plates, Philadelphia	1.88	1.88½	1.88½	1.49½
Tank plates, Chicago	1.75	1.75	1.75	1.70
Sheets, No. 10, hot rolled, Pitts.	1.75	1.75	1.75	1.55
Sheets, No. 24, hot ann., Pitts.	2.25	2.25	2.25	2.00
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.85	2.65
Sheets, No. 10, hot rolled, Gary	1.85	1.85	1.85	1.70
Sheets, No. 24, hot anneal., Gary	2.35	2.35	2.35	2.10
Sheets, No. 24, galvan., Gary	2.95	2.95	2.95	2.75
Plain wire, Pittsburgh	2.20	2.20	2.20	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.25
Wire nails, Pittsburgh	2.35	2.35	2.35	1.85
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	26.00
Wire rods, Pittsburgh	36.00	36.00	36.00	35.00

	April 7, 1934	Mar. 1934	Jan. 1934	April 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.26	19.26	19.26	16.26
Basic, Valley	17.00	17.00	17.00	14.00
Basic, eastern, del. eastern Pa.	18.76	18.76	18.76	14.19
No. 2 foundry, del. Pittsburgh	18.76	18.76	18.76	15.76
No. 2 foundry, Chicago	17.50	17.50	17.50	15.50
Southern, No. 2, Birmingham	13.50	13.50	13.50	11.40
No. 2X, Eastern, del. Philadelphia	19.63	19.63	19.63	13.76
Malleable, valley	17.50	17.50	17.50	14.50
Malleable, Chicago	17.50	17.50	17.50	15.50
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.38	18.38	18.38	15.63
Ferromanganese, del. Pittsburgh	90.24	90.24	90.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$14.25	14.30	13.05	9.90
Heavy melting steel, eastern Pa.	11.50	11.70	11.65	6.90
Heavy melting steel, Chicago	11.75	12.00	10.45	6.55
No. 1 wrought, eastern Pa.	12.25	12.75	12.75	7.35
No. 1 wrought, Chicago	10.90	10.80	9.45	5.50
Rails for rolling, Chicago	12.75	12.75	11.25	8.50
Coke				
Connellsville, furnace, ovens	3.60	3.35	3.60	1.75
Connellsville, foundry, ovens	4.60	4.25	4.25	2.25

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.75c
Gary, base	1.85c
Chicago, del.	1.88c
New York, del.	2.08c
Philadelphia, del.	2.04c
Birmingham, base	1.90c
St. Louis, del.	2.07c
F.o.b. cars, dock, Pacific ports	2.42½c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.25c
Gary, base	2.35c
Chicago, del.	2.38c
Detroit, del.	2.45c
New York, del.	2.58c
Philadelphia, del.	2.54c
Birmingham, base	2.40c
St. Louis, del.	2.57c
F.o.b. cars, dock, Pacific ports	2.95c

GALVANIZED No. 24

Pittsburgh, base	2.85c
Gary, base	2.95c
Chicago, del.	2.98c
Philadelphia, del.	3.14c
New York, del.	3.18c
Birmingham, base	3.00c
St. Louis, del.	3.17c
San Francisco, f.o.b. cars, dock	3.55c

TIN MILL BLACK No. 28

Pittsburgh, base	2.65c
Gary, base	2.75c
St. Louis, del.	2.97c

COLD ROLLED No. 10

Pittsburgh, base	2.30c
Gary, base	2.40c
Detroit, delivered	2.50c
Philadelphia, del.	2.59c
New York, del.	2.63c

COLD ROLLED No. 20

Pittsburgh, base	2.75c
Gary, base	2.85c
Detroit, delivered	2.95c
Philadelphia, del.	3.04c
New York, del.	3.08c

ENAMELING SHEETS

Pittsburgh, No. 10	2.45c
Pittsburgh, No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base contract	$5.25
Do., stock	4.55
Long ternes, No. 24 unassorted	3.25c

Steel Plates

Pittsburgh, base	1.70c
New York, del.	1.98c
Philadelphia, del.	1.88½c
Boston, del.	2.10c
Buffalo, del.	1.93½c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Birmingham, base	1.85c
Coatesville, base	1.80c
Sparrows Pt., base	1.80c
Pacific Coast, f.o.b. cars, dock	2.25c
St. Louis, del.	1.97c

Structural Shapes

Pittsburgh, base	1.70c
Philadelphia, del.	1.90½c
New York, del.	1.95½c
Boston, del.	2.08½c
Bethlehem, base	1.80c
Chicago, base	1.75c
Cleveland, del.	1.88½c
Buffalo, base	1.80c
Birmingham, base	1.85c
Pacific Coast, f.o.b. cars, dock	2.25c

Bars

SOFT STEEL

Pittsburgh, base	1.75c
Chicago, base	1.80c
Birmingham, base	1.90c
Buffalo, base	1.85c
Cleveland, base	1.80c
Detroit, del.	1.90c
Pacific Coast ports, cars, dock, c.i.f.	2.30c
Philadelphia, del.	2.04c
Boston, del.	2.15c
New York, del.	2.08c
Pitts., forg. qual.	1.75c-2.25c

RAIL STEEL

To Manufacturing Trade

Pittsburgh	1.65c
Chicago	1.70c
Cleveland	1.70c
Gary, Ind.	1.70c
Buffalo	1.75c

IRON

Terre Haute, Ind. base	1.60c
Philadelphia, base..	1.74c
Pittsburgh, refined..	2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh	1.90c
Chicago, Gary, Buffalo, Cleve., Birm., Young...	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c
Philadelphia, del.	2.19c

Rail Steel

Pittsburgh, base	1.75c
Chicago, Buffalo, Cleveland, Birm., Young.	1.80c
Gulf ports	2.15c
Pacific coast ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.35
Cement coated nails	2.35
Galvanized nails, 15 gage and coarser	4.35c
Do., 16 gage and finer..	4.85c

(Per pound)

Polished staples	3.05c
Galvanized fence staples	3.30c
Barbed wire, galv.	2.85c
Annealed fence wire	2.35c
Galvanized fence wire....	2.70c
Woven wire fencing (base column, c.l.)	$60.00
Plain wire, 6-9 gage to mfg. trade	2.20c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Chicago, Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Shafting □ □ □

Turned and ground, Pitts. base	
1⅛-inch	3.40c
1 3/16 to 1½-inch	2.90c
1 3/16 to 1 7/8-inch	2.75c
1 15/16 to 2⅞-inch	2.60c
2 15/16 to 7-inch	2.45c

Alloy Steel Bars □

Hot Rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton	2.45c
Bethlehem	2.55c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo	0.50
4600 .20 to .30 Mo. 125-1.75 Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250.....carbon base plus extras	

Strip and Hoops □

Hot strip to 23 15/16-in. Pittsburgh	1.75c
Do., Chicago	1.85c
Do., del. Detroit..	1.95c
Do., del. Phila.	2.04c
Do., del. N. Y.	2.08c
Cooperage hoop, Pittsburgh	1.85c
Do., Chicago	1.95c
Cold-rolled strip, Pitts., Cleve.	2.40c
Worcester	2.60c

Rails, Track Material □

(Gross Ton)

Standard rails, mill	$36.37½
Relay rails. Pitts.	
20-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pitts., Chi.	$32.00
Do., reroll. qual....	$31.00
Angle bars, mills...	2.55c
Spikes, R. R. base..	2.40c
Track bolts, base....	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag	
Screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts	70 off
Tire bolts	60 off
Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller,	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET Screws

Upset, 1-in., smaller....	75-10 off
Upset, larger than 1-in....	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c.l., Pittsburgh, Cleveland	2.75c
Struc., c.l., Chicago	2.85c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 10 off
Wrought washers, Pitts., Chi., Phila.	6.00-6.25 off

Cut Nails, Piling □

Cut nails, Pitts:; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more; no discount on size extras	$3.05
Do., less than 5 kegs; no discount on size extras	$3.20
Steel piling, Pittsburgh....	2.00c
Steel piling, Chi., Buff.....	2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD
Steel

In.	Blk.	Gal.
¼ and ⅜	57	38½
½	62	50½
¾	65½	55½
1—3	67½	58½

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD
Steel

2	63½	54½
2½—3	66½	57½
3½—6	68½	59½
7 and 8	67½	57½
9 and 10	67	57

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE
Steel

⅛-inch, butt weld	50½
¼—⅜, butt weld	56
½, butt weld	61
¾, butt weld	64½
1—3, butt weld	66½
2-inch, lap weld	62½
2½—3, lap weld	65½
3½—6, lap weld	67½
7—8, lap weld	66½

Iron

⅛—1½-inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES
Cold Drawn

2—2¼	27	3¼—3½	41
2½—2¾	34	4	43
3	38	4½, 5, 6	36

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled

2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Carload and more gets preferential of two 5%; 2000 to 9999 pounds, 10 points off base and one 5%, under 2000 pounds, 15 points under base and one 5%.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Pet Net Ton

6-in., & over, Birm.	$36.00-37.00
4-in., Birm.	39.00-40.00
4-in., Chicago	47.00-48.00
6 to 24-in., Chicago	44.00-45.00
6-in., & over, east. fdy.	40.00
Do., 4-in.	43.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$90.00

Six to 24-inch, fittings base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.30
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Young.	26.00
Chicago	26.00
Canton, O.	26.00

SLABS

Pitts., Cleve., Young.	26.00

WIRE RODS

Pitts., Cleveland	36.00
Chicago	37.00

SKELP

All grades, Pitts., and Chicago	1.60c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

*Connellsville fur....	$3.60- 3.85
*Connellsville fdry..	4.60
*Connell. prem. fdy.	5.35
New River fdry.	6.00
Wise county fdry...	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del	9.25
New England, del...	10.50
St. Louis, del.	9.25
Birmingham, ovens	5.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.
Tank lots

	Spot
*Pure benzol	$0.19
*90 per cent benzol.	$0.19
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)..	0.163c
Do. (100 lbs.)	0.173

Eastern Plants, Per Pound, In Barrels

†Naphthalene flakes and balls	6.00

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

†Western prices ½-cent higher per pound.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25.

	No. 2 Fdry.	Malleable	Gross tons. Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$18.50	$19.00	$18.00	$19.50
Birdsboro, Pa.	18.50	19.00	18.00	19.50
Swedeland, Pa.	18.50	19.00	18.00	19.50
Sparrows Point, Md.	18.50	.....	18.00	.....
From Swedeland, Pa., del. to Philadelphia	19.26	19.76	18.76	.....
From Bethlehem, del. to Brooklyn	20.77	21.27	.....	.....
From Bethlehem, del. to Newark, N. J.	19.99	20.39	.....	.....
Basing Point:				
Everett, Mass.	18.50	19.00	18.00	19.50
From Everett, del. to Boston	19.00	19.50	18.50	20.00
Basing Point:				
Buffalo	17.50	18.00	16.50	18.50
From Buffalo, del. to Boston	19.00	19.50	18.50	20.00
Basing Points:				
Neville Island, Pa.	18.00	18.00	17.00	18.50
Sharpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown, O.	17.50	17.50	17.00	18.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, O.	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
From Detroit, del. to Saginaw, Mich.	19.60	19.60	19.10	20.10
From Cleveland, del. to Akron, Canton, O.	18.76	18.76	18.26	19.26
From Toledo, del. to Mansfield, O.	19.26	19.26	18.76	19.76
Basing Point:				
Jackson, O.	19.25	19.25	18.75	.....
Hamilton, O.	17.50	17.50	17.00	18.00
From Hamilton, del. to Cincinnati	18.51	18.51	18.01	19.01
Do., del. to Indianapolis	19.77	19.77	19.27	20.27
Basing Points:				
Duluth	18.00	18.00	.....	18.50
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	.....
From Duluth, del. to St. Paul	19.94	19.94	.....	20.44
From Chicago, del. to Milwaukee	18.50	18.50	18.00	19.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	20.40	20.40	19.90	20.90
From Granite City, del. to St. Louis	18.00	18.50	17.50	.....
Basing Point:				
†Birmingham, Ala.	13.50	.....	12.50	18.00
From Birmingham, del. to:				
Boston	18.62	.....	18.50	.....
Newark, N. J.	19.58	.....	.....	.....
Brooklyn, N. Y.	20.39	.....	.....	.....
Baltimore	19.02	.....	18.90	.....
Philadelphia	18.88	.....	18.76	.....
Cleveland	17.62	.....	17.50	.....
Cincinnati	18.13	.....	17.51	.....
Chicago	*17.72	.....	17.60	.....
St. Louis	17.62	.....	17.50	.....

†Southern delivery only. Prices at northern points are adjusted to quotations on northern iron. *Over 0.70 phos.

Basing Point:	
Provo, Utah	16.50

LOW PHOS.

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.00 Basing point: †Johnson City, Tenn.—$23.00
†Offgrade material is $19.

Philadelphia, standard and copper bearing	24.13

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	Lake Superior fur.	20.50
Pitts. dist. fur.	17.75	Do., del. Chicago	23.54

SILVERY

Jackson county, O., base; 6%—$22.25; 7—$23.25; 8—$24.25; 9—$25.25; 10—$26.25; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base; 10%—$27.25; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore

LAKE SUPERIOR ORE
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES
Cents, unit, del. E. Pa.

Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-65% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$14.00-14.25
N. F. fdy., 55%	7.00
Chrome ore 48% gross ton, c.i.f.	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	24.00
So. African, 52%	24.00
So. Afr., 49-51%	22.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00

Second Quality

Pa., Ohio, Ill., Ky., Md., Mo., Ga., Ala.	40.00

MALLEABLE BUNG BRICK all bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

MAGNESITE

Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00

BASIC BRICK
Net ton, f.o.b. Baltimore, Plymouth, Meeting, Pa., Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar 85-5

Washed gravel, duty paid, tide, net ton	$19.00
*Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$17.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
del. Pittsburgh	90.24
Spiegeleisen, 19-20%, dom. fur. spot†	26.00
Ferrosilicon, 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent. Spot, $5 a ton higher.	126-130.00
Silicomang., 2½ carb	90.00
2% carbon	95.00
1% carbon	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont.	1.16- 1.25
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 8.25c Conn. copper

Sheets	
Yellow brass (high)	13.75
Copper, hot rolled	15.00
Lead, cut, to jobbers	7.75
Zinc, 100-lb. base	9.00
Tubes and Pipes	
High yellow brass	16.25
Seamless copper	16.25
Rods	
High yellow brass	12.25
Copper, hot rolled	12.25
Anodes	
Copper, untrimmed	12.75
Wire	
Yellow brass (high)	14.25

Old Metals

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.75- 5.00
*Chicago	4.62½-5.12½
*Cleveland	5.25- 5.50
St. Louis	4.75- 5.00
Heavy Copper and Wire	
*New York	6.37½- 6.50
*Chicago, No. 1	6.00- 6.25
*Cleveland	5.75- 6.00
St. Louis	5.75- 6.00
Composition Brass Borings	
*New York	4.50- 4.75
Light Copper	
*New York	5.50- 5.75
*Chicago	4.75- 5.00
*Cleveland	5.25- 5.50
St. Louis	4.75- 5.00
Light Brass	
*Chicago	2.62½-2.87½
*Cleveland	3.25- 3.50
Lead	
New York	3.00- 3.25
Cleveland	3.00- 3.25
Chicago	2.75- 3.00
St. Louis	3.10- 3.25
Zinc	
New York	2.25- 2.50
Cleveland	2.25- 2.50
Chicago	2.25- 2.50
St. Louis	2.75- 3.00
Aluminum	
*Clips, soft, Cleve.	13.00-14.50
Borings, Cleveland	7.00- 7.50
Mixed, cast, Cleve.	11.00-11.25
Mixed, cast, St. L.	11.00-11.25

Secondary Metals

*Brass ingot, 85-5-5-5	8.50
Remelt al. No. 12	15.50-16.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.50-10.00
Boston, dealers	7.50- 7.75
Buffalo, No. 1	12.50-13.00
Buffalo, No. 2	11.00-11.50
Chicago	11.50-12.00
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.50-12.00
Detroit, No. 1	9.75-10.25
Detroit, No. 2	8.75- 9.25
Eastern Pa.	11.50
Eastern Pa., No. 2	9.50
Federal, Ill.	8.75- 9.25
Granite City, R. R.	8.75- 9.25
Granite City, No. 2	7.75- 8.25
N. Y., deal. R. R.	9.50
N. Y., deal. No. 2	8.00
Pittsburgh, No. 1	14.00-14.50
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo, dealers	11.00-11.50
Chicago, factory	10.50-11.00
Cleveland	11.00-11.50
Detroit	9.75-10.25
E. Pa., new mat.	10.50-11.00
Pittsburgh	14.00-14.50
St. Louis	8.50- 9.00
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo	7.50- 8.00
Cincinnati, del.	7.50- 8.00
Cleveland	8.50- 9.00
Pittsburgh	12.50-13.00
St. Louis	6.00- 6.50

SHEET CLIPPINGS LOOSE

Chicago	6.50- 7.00
Cincinnati	7.00- 7.50
Detroit	6.50- 7.00
St. Louis	5.75- 6.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Boston, dealers	7.50- 7.75
Buffalo	14.00-14.50
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	13.00-13.50
Detroit	11.50-12.00
Pitts., (open-hearth 3 ft. and less	15.75-16.25
St. Louis, 2 ft. & less	12.50-13.00

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.75- 5.00
Buffalo	10.75-11.25
Chicago, net	7.75- 8.25
Cincinnati, dealers	7.00- 7.50
Detroit, net	7.50- 8.00
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	6.75- 7.25

COUPLERS, SPRINGS

Buffalo	13.75-14.25
Chicago, springs	12.50-13.00
Eastern Pa.	15.50
Pittsburgh	16.00-16.50
St. Louis	9.50-10.00

ANGLE BARS—STEEL

Chicago	12.50-13.00
St. Louis	9.50-10.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	14.00-14.50
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa. crops	14.00-14.50
Pittsburgh, billet, bloom crops	17.00-17.50
Pittsburgh, sheet bar crops	16.00-16.50

FROGS, SWITCHES

Chicago	11.50-12.00
St. Louis, cut	9.50-10.00

SHOVELING STEEL

Chicago	11.50-12.00
Federal, Ill.	7.75- 8.25
Granite City, Ill.	8.75- 9.25

RAILROAD WROUGHT

Birmingham	7.00- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	12.50-13.00
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	11.50-12.00
Cincinnati, No. 2	9.50-10.00
Eastern Pa.	12.00-12.50
N. Y., No. 1 deal.	8.50- 9.00
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	8.75- 9.25

SPECIFICATION PIPE

Boston	4.50- 4.75
Eastern Pa.	9.50-10.00
New York, dealers	5.25- 5.50

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	10.50-10.75
Cinci., No. 1 deal.	7.00- 7.50
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	9.00- 9.50
Detroit, No. 1 new	8.75- 9.25
Valleys, new No. 1	14.00-14.50

MACHINE TURNINGS

Bimingham	4.50- 5.00
Boston, dealers	4.00- 4.25
Buffalo	6.50- 7.00
Chicago	7.00- 7.50
Cincinnati, dealers	6.00- 6.50
Cleveland	9.00- 9.50
Detroit	6.50- 7.00
Eastern Pa.	7.50
New York, dealers	3.25- 3.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00
Valleys	12.00-12.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Cincinnati, dealers	6.00- 6.50
Cleveland	9.00- 9.50
Detroit	7.50- 8.00
Eastern Pa.	6.50
New York, dealers	2.00- 2.50
Pittsburgh	8.50- 9.00

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.50- 8.00
Chicago	7.50- 8.00
Cincinnati, dealers	6.00- 6.50
Cleveland	9.00- 9.50
Detroit	7.50- 8.00
E. Pa., chemical	12.00-15.00
New York, dealers	3.00- 3.50
Pittsburgh	8.50- 9.00
St. Louis	4.50- 5.00

PIPE AND FLUES

Cincinnati, dealers	4.50- 5.00

RAILROAD GRATE BARS

Buffalo	7.00- 7.50
Chicago, net	7.50- 8.00
Cincinnati	6.00- 6.50
Eastern Pa.	9.00- 9.50
New York, dealers	5.00- 5.50
St. Louis	6.00- 6.50

FORGE FLASHINGS

Boston, dealers	6.00- 6.50
Buffalo	11.00-11.50
Cleve., over 10 in.	9.25- 9.75
Detroit	8.50- 9.00

FORGE SCRAP

Boston, dealers	5.00- 6.00
Chicago, heavy	12.50-13.00
Eastern Pa.	10.50-11.00

ARCH BARS, TRANSOMS

St. Louis	11.00-11.50

AXLE TURNINGS

Boston, dealers	4.50- 5.00
Buffalo	9.00- 9.50
Chicago, elec. fur.	10.50-11.00
Cleveland	9.50-10.00
Eastern Pa.	11.00
St. Louis	7.50- 8.00

STEEL CAR AXLES

Birmingham	10.50-11.00
Boston, ship, point.	9.00- 9.50
Buffalo	13.00 13.50
Chicago, net	12.00-12.50
Eastern Pa.	14.00
St. Louis	9.50-10.00

SHAFTING

Boston, ship. point.	11.00-11.25
Eastern Pa.	16.25
New York, dealers	11.50-12.00
St. Louis	13.00-13.50

CAR WHEELS

Birmingham, iron	9.50-10.00
Boston, iron deal.	6.50- 6.75
Buffalo, iron	12.25-12.75
Buffalo, steel	13.75-14.25
Chicago, iron	12.00-12.50
Chicago, rolled steel	12.50-13.00
Cincinnati, iron	10.25-10.50
Eastern Pa., iron	13.50-14.00
Eastern Pa., steel	15.00-15.50
Pittsburgh, iron	13.00-13.50
Pittsburgh, steel	16.00-16.50
St. Louis, iron	9.50-10.00
St. Louis, steel	9.00- 9.50

NO. 1 CAST SCRAP

Birmingham	9.00- 9.50
Boston, No. 2	5.50- 6.00
Boston, tex. con.	10.50-11.00
Buffalo, cupola	12.00-12.50
Buffalo, mach.	13.25-13.75
Chicago, agri. net	8.25- 8.75
Chicago, mach. net	9.00-10.00
Chi., railroad net	9.00- 9.50
Cinci., mach. cup	10.75-11.25
Cleveland, cupola	11.50-12.50
Detroit, net	9.50-10.00
Eastern Pa., cupola	12.50-13.00
Pittsburgh, cupola	13.00-13.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.25- 8.75
St. L., No. 1 mach.	10.00-10.50

HEAVY CAST

Boston, del.	6.75- 7.00
Buffalo, break.	9.00- 9.50
Cleveland, break.	8.50- 9.00
Detroit, break.	8.50- 9.00
Detroit, auto net	11.00-11.50
Eastern Pa.	11.50-12.00
N. Y., No. 1, deal.	8.00- 8.50
N. Y., break. deal.	8.00- 8.50
Pittsburgh	12.00-12.50

MALLEABLE

Boston, consum.	12.50-13.00
Buffalo	13.25-13.75
Chicago, R. R.	12.25-12.75
Cincinnati, agri. del.	9.75-10.25
Cinci., R. R. del.	10.50-11.00
Cleveland, rail.	13.00-13.50
Detroit, auto	9.75-10.25
St. Louis, R. R.	9.50-10.00
Eastern Pa., R. R.	11.50-12.50

RAILS FOR ROLLING

5 feet and over

Birmingham	11.00-11.50
Boston, dealers	7.25- 7.50
Buffalo	12.00-12.50
Chicago	12.50-13.00
Eastern Pa.	13.00
New York, dealer	8.00- 8.50
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	12.50-13.00
St. Louis, No. 1	9.75-10.25

LOW PHOS. PUNCHINGS

Buffalo	13.75-14.25
Chicago	12.50-13.00
Eastern Pa.	14.50-15.00
Pittsburgh	16.00-16.50

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
March 31	8.00	8.12½	7.75	55.50	55.55	4.00	3.90	4.30	*22.90	7.60	36.00
April 2	8.00	8.12½	7.75	55.60	55.67½	4.00	3.90	4.30	*22.90	7.60	36.00
April 3	8.00	8.12½	7.75	55.55	55.62½	4.00	3.90	4.30	*22.90	7.65	36.00
April 4	8.00	8.12½	7.75	55.25	55.32½	4.00	3.90	4.30	*22.90	7.75	36.00
April 5	8.25	8.37½	7.75	55.75	55.82½	4.00	3.90	4.30	*22.90	7.85	36.00
April 6	8.25	8.37½	7.75	56.70	56.77½	4.00	3.90	4.35	*22.90	7.95	36.00

*Nominal range 10.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.75c
Boston††	2.90c
Buffalo	2.95c
Chattanooga	3.26c
Chicago	2.90c
Cincinnati	3.10c
Cleveland	2.90c
Detroit	2.98½c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.00c
New York‡(d)	3.17c
Pittsburgh	2.85c
Philadelphia*	2.75c
San Francisco	3.55c
Seattle	3.40c
St. Louis	3.14c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Baltimore*	2.60c
Chattanooga	3.26c
Chicago	2.75c
Cincinnati	3.10c
Detroit	2.98½c
New York‡(d)	3.10c
Philadelphia*	2.75c
St. Louis	3.14c
Tulsa	3.25c

REINFORC. BARS	
Boston	2.75c-3.25c
Buffalo	1.95c
Chattanooga	3.26c
Chicago	1.95c-2.10c
Cleveland (c)	1.97½c
Cincinnati	3.10c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.00c
New York	3.17c
Philadelphia	2.62½c
Pitts., plain	3.00c
Pitts., twisted squares	3.12½c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.29c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES	
Baltimore*	2.75c
Boston††	3.07c
Buffalo	3.20c
Chattanooga	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland	3.21c
Detroit	3.30c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.27c
Philadelphia*	2.75c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.75c
Boston††	3.08c
Buffalo	3.20c
Chattanooga	3.46c
Chicago	3.10c
Cincinnati	3.30c
Cleveland, ¼-in. and thicker	3.21c
Cleve., ⅜-in.	3.20c
Detroit	3.30c
Detroit, ⅜-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia*	2.75c
Phila. floor	4.35c
Pittsburgh	3.05c
Portland	3.40c
San Francisco	3.50c
Seattle	3.40c
St. Louis	3.34c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*	2.95c
Boston††	3.15c
Buffalo	3.10c
Chattanooga	3.26c
Chicago	2.95c
Cincinnati	3.10c
Cleveland	3.01c
Det., 8-10 ga.	3.03½c
Houston	3.35c
Los Angeles	3.65c
New Orleans	3.50c
New York	3.17c
Portland	3.65c
Philadelphia*	2.95c
Pittsburgh	2.85c
San Francisco	3.75c
Seattle	3.65c
St. Louis	3.19c-3.36c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†	3.50c
Boston (g)	3.75c
Buffalo	3.25c
Chattanooga	4.01c
Chicago	3.70c
Cincinnati	3.85c
Cleveland	3.76c
Detroit	3.78½c
Los Angeles	4.15c
New York	3.65c
Philadelphia*†	3.40c
Pittsburgh**	3.40c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.94c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore*†	3.75c
Buffalo	4.00c
Boston (g)	4.35c
Chattanooga	4.61c
Chicago	4.20c-4.30c
Cincinnati	4.45c
Cleveland	4.36c
Detroit	4.45c
Houston	4.40c
Los Angeles	4.75c
New Orleans	4.35c
New York	4.25c
Pitts.**	3.90c-4.20c
Portland	4.85c
San Francisco	4.85c
Seattle	4.85c
St. Louis	4.54c
St. Paul	4.19c
Tulsa	5.10c
Philadelphia*†	4.00c

BANDS	
Baltimore	3.05c
Boston††	3.15c
Buffalo	3.30c
Chattanooga	3.51c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Detroit, ⅜-in. and lighter	3.28½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.20c
New York(d)	3.42c
Philadelphia	3.05c
Pittsburgh	3.10c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Paul	3.20c
Tulsa	3.45c
St. Louis	3.44c

HOOPS	
Baltimore	2.80c
Boston	4.15c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.35c
Det., No. 14 and lighter	3.28½c
New York	3.42c
Philadelphia	3.30c
Pittsburgh	3.60c
Seattle	5.40c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore (c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	5.95c
New Orleans	4.25c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle (f)(d)	4.75c
St. Paul	3.20c
St. Louis	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	
Boston, 0.100-in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleveland (b)	5.55c
Detroit	5.40c
Philadelphia	4.00c
New York	4.55c
St. Louis	5.74c

(b) Net base, straightening, cutting, boxing, 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 5

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

PIG IRON	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	£ s d
Foundry, 2.50-3.00 Silicon	$15.06	2 18 6	$8.03	1 13 0
Basic bessemer	13.91	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05	16.09	3 2 6	....	.....
SEMIFINISHED STEEL				
Billets	$28.33	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage	40.17	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$39.91	7 15 0	$26.77	5 10 0
Merchant bars	1.67c	7 5 0	.69c to .72c	3 2 6 to 3 5 0
Structural shapes	1.70c	7 7 6	.63c	2 17 6
Plates, †¼ in. or 5 mm.	1.84c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.13c	9 5 0	1.27c to 1.29c	5 15 0 to 5 17 6
Sheets, gal., 24 gage, corr.	2.59c	11 5 0	1.43c	6 10 0
Bands and strips	1.90c	8 5 0	.88c	4 0 0
Plain wire, base	2.24c	9 15 0	1.18c	5 7 6
Galvanized wire, base	2.65c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.76c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 4.25	0 16 6	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d 4($3.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$17.38	3 7 6(a)	$12.87	195	$13.81	295	$23.80	63
Basic bessemer pig iron	16.74	3 5 0(a)*	12.21	185	13.34	285	26.26	(b)69.50
Furnace coke	4.51	0 17 6	7.92	120	5.15	110	7.27	19.25
Billets	28.33	5 10 0	28.38	430	20.59	440	36.46	96.50
Standard rails	1.90c	8 5 0	2.10c	700	2.31c	1,100	2.26c	132
Merchant bars	1.98c	8 12 0	1.68c	560	1.16c	550	1.88c	110
Structural shapes	2.01c	8 15 0	1.65c	550	1.16c	550	1.84c	107.50
Plates, †¼-in. or 5 mm.	2.04c	8 17 6	2.10c	700	1.47c	700	2.17c	127
Sheets, black	2.36c	10 5 0§	2.55c	850‡	1.63c	775‡	2.46c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.93c	12 15 0	4.50c	1,500	3.15c	1,500	6.33c	370
Plain wire	2.24c	9 15 0	3.39c	1,130	2.31c	1,100	2.96c	173
Bands and strips	2.42c	10 10 0	1.95c	650	1.47c	700	2.17c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. (a) del. Middlesbrough. (b) hematite

Bars

Bar Prices, Page 56

Pittsburgh—Last week a $3 a ton advance in carbon steel bars was announced to place the market at Pittsburgh at 1.90c base, effective late this week. It is expected that a similar advance will be taken in alloy bars from the present 2.45c, Pittsburgh, base. The farm implement trade and railroads have been heavier buyers of bars recently, in company with the automotive industry.

Cleveland — Tonnage contracted for second quarter is equal to or larger than that booked for first quarter; in the case of one leading producer here, 10 per cent higher. Sellers have tried to guard against speculative buying in advance of the $3 a ton increase effective this week. The new price is 1.95c, base, Cleveland, for merchant steel bars. Specifications also have been in increased volume, little time lapsing between placing and releasing April quotas.

Chicago—Second quarter contracting for various types of bars has increased rapidly, stimulated by recent price advances. An increase of $3 a ton in soft steel and rail steel bars has been or is being filed, the new quotation of 1.95c, Chicago, for soft steel bars and 1.85c for rail steel becoming effective in about another week. Specifications and shipments generally are steady with demand from miscellaneous consumers showing some improvement.

Boston—While specifications have increased only slightly, buyers are covering heavily for second quarter on steel bars, with indications that shipments will be considerably larger during that period. The new prices on bars will be 2.30c, delivered, Boston.

New York—Commercial steel bar consumers are not increasing spot requirements appreciably, but are actively contracting for the quarter, seeking coverage before the $3 advance goes into effect at Pittsburgh April 12. The new price will be 1.90c, Pittsburgh, or 2.23c, New York. Common iron bars are likely to be increased similarly, to 1.75c, eastern basing point.

Philadelphia — Commercial steel bar contracting is brisk in view of the $3 advance, which shortly will fix the Pittsburgh price at 1.90c, and the Philadelphia quotation at 2.19c. Modest railroad tonnages feature current specifications. Common iron bars are scheduled to be advanced $3 a ton, to 1.75c, eastern basing point.

Soviet Russia is opening up a new manganese field in Bashkiria and plans to produce 30,000 tons of manganese this year.

Plates

Plate Prices, Page 56

Pittsburgh—An advance of $3 a ton to 1.80c, Pittsburgh, on steel plates was announced last week and consequently requests for coverage at 1.70c were especially heavy. Further plate orders from car shops is expected to be in the market this week although tank and river barge activity still is slow. On a New Orleans opening last week for a small steel oil barge of about 100 tons, McClintic-Marshall Corp., Bethlehem, Pa., bid low at $9718 against a government estimate of $15,063. Low bidder was approximately $25 per ton under the second low bidder.

Cleveland—Interest during the week centered in consumer commitments for second quarter, with prices up $3 a ton this week. Some boilermakers long out of the market covered requirements. Manufacturers of heavy presses also indicated larger needs for second quarter. Railroad tonnage still is light.

Chicago—Railroads and equipment builders are furnishing a larger volume of plate business both for repair work and new cars. Material for building of the Van Sweringen cars is being released and several roads are taking heavier shipments for rehabilitation programs. New inquiries for railroad equipment are headed by 500 steel box cars for the Chicago Great Western. Tank work continues moderately active. Plate contracting is fairly heavy with the new price of 1.90c, Chicago, an increase of $3 a ton, effective in about a week.

Boston—Plate specifications hold to the recent current rate with some improvement in miscellaneous buying. There has been general coverage through the quarter before the price advance with indications that some of this material will not be taken until late in the second quarter.

New York—Eastern platemakers are filing an advance of $3 per ton, making the market 1.95c, Coatesville, Pa., and Sparrows Point, Md. One producer makes the price effective at Coatesville April 14. Plate contracting here is brisk, with good railroad equipment tonnage pending.

Philadelphia—With eastern producers likely to follow the lead at Pittsburgh, in advancing prices $3 a ton, consumers of plates are contracting heavily. There also has been some improvement in specifications, although buying at the moment appears largely speculative. Sellers look for June to be an exceptionally heavy producing month, with a tendency on the part of consumers not only to cover as fully as possible on this quarter's requirements, but to also lay up some stocks. This represents a problem to which producers are giving serious consideration, as they are anxious to keep at least a reasonable relationship between consuming specifications and actual needs. Pennsylvania railroad distributed several hundred tons against specifications figured March 26, and the Norfolk & Western is figuring tentatively on approximately 700 tons for car parts.

Contracts Pending

290 tons, 22-inch pipe, for Metropolitan water district, Los Angeles, to Southern Pipe & Casing Co., Los Angeles.

272 tons, for Norfolk navy yard, under new schedule 1908, opened March 20, 193 tons to Joseph T. Ryerson & Sons Inc., 73 tons to Jones & Laughlin Steel Corp., and 6 tons to Lukens Steel Co.

190 tons, storage tank, Atlantic Refining Co., Philadelphia, to Chicago Bridge & Iron Works, Chicago.

150 tons, pontoon pipe for United States engineer's office, Sacramento, Calif., to Pacific Coast Engineering Co., Oakland, Calif.

Contracts Placed

4943 tons, Fort Peck, Mont., dam project; bids April 11 by United States engineers, Kansas City, Mo.

2500 tons, liner plate, metropolitan water district, Los Angeles; bids April 23.

300 tons, two steel oil barges, 120 x 30 x 7 feet, United States engineer, Vicksburg, Miss.; bids April 12.

200 tons, standpipe, Albermarle, N. C.; bids April 18.

200 tons, 500,000-gallon water tank, Waukesha, Wis.; bids soon.

100 tons, steel oil barge for New Orleans engineers; McClintic-Marshall Corp. low at $9718, Dravo Contracting Co., Neville Island, Pa., second at $12,260, Midland Barge Co., Midland, Pa., third at $12,400; government estimate $15,063.

Sheets

Sheet Prices, Page 56

Pittsburgh — The entire sheet schedule has been advanced $5 to $8 effective this week. Galvanized sheets, black sheets, and 20 gage cold-rolled sheets are up $8, while No. 10 gage hot-rolled sheets are raised $5 a ton. On heavy cold-rolled sheets, No. 10 gage, an advance of $5 per ton to 2.55c, Pittsburgh, was announced. Contracting has been heavy. The automotive trade has been one of the outstanding groups to cover. In-

corporating these advances, the sheet market will soon be quoted as follows at Pittsburgh: No. 24 gage hot-rolled annealed, 2.65c; galvanized sheets, 3.25c; No. 10 gage hot-rolled, 2.00c; No. 10 gage cold-rolled, 2.55c; and No. 20 gage cold-rolled, 3.15c.

Cleveland—The immediate result of sheet price advances ranging from $5 to $8 a ton announced last week to become effective this week on all remaining second quarter business was an acceleration in contracting. Large consumers have covered; a small percentage of specialty manufacturers unable to foresee requirements will pay higher prices. Some sellers have a clause in their contracts that unless it is otherwise mutually agreed specifications must be in not later than the fifteenth day of the month preceding the month in which shipments are to be made. As few contracts for second quarter were made last month this provision has been waived, except that buyers have been releasing all their April tonnage. Some specifications already have been issued for May.

Chicago—Advances of $5 to $8 a ton in sheet prices have developed a sharp increase in contracting. Most major consumers are expected to cover second quarter needs, if not requirements into third quarter, before the new schedules become effective April 13. Shipments and specifications are fairly steady and deliveries to the automotive industry have recovered at those points where the labor controversy recently developed some decrease. Consumption by farm implement manufacturers is active compared with the volume of the preceding several years.

Boston—A broader demand for sheets with slightly heavier specifications is noted. Industrial buyers, jobbers and railroad repair shops are more active. Requirements for building are slightly heavier.

New York—Steel pickled breakdown sheets known as the Ford special have been advanced $8 a ton to 3.15c, base, Pittsburgh. Cold finished mill run No. 20 are up $8 to 3.05c; cold finished mill run No. 10 up $5 to $2.45c; long ternes No. 24, unassorted, up $8 to 3.65c, Pittsburgh. No. 20 porcelain enamel sheets have been advanced $6 a ton to 3.60c, and No. 10 $3 to 2.60c. These new prices will be effective April 16.

Philadelphia — Substantial contracting features the local sheet market, with prices advanced $5 to $8 a ton. Heavy automotive tonnage has been placed, and radio manufacturers are buying more freely. North Carolina opened bids last week on 200 tons of license tag stock, and the Pennsylvania railroad on 6000 sheets, approximately 16 gage, 24 x 72 inches, for road signs.

Buffalo — Buffalo district sheet mills are operating at 80 to 90 per cent, their highest rate in recent years. With heavy bookings on hand there is no sign of slackening of production for probably 60 days.

Washington—Navy's requirements of corrosion resisting steel of the chrome-nickel type are unusually heavy at this time. Last Tuesday bids were opened on about 500 tons of stainless steel sheets, plates, strip, angles and bars, for various navy yards under schedule 2007. On April 20, the navy will open bids under schedules 2131 and 2132 for 15 tons of stainless steel floor sheet, with raised pattern. On April 10, on schedule 2039, it will open bids on four stainless steel gasoline storage tanks for Brooklyn and Charleston. Bids on 195 tons of galvanized and black sheets for various navy yards, schedule 2106 were opened April 10.

Cincinnati—Sheet mill books in this district for second quarter were filled rapidly last week. Ordering was broad, from all classes of consumers. American Rolling Mill Co. has booked 5280 copper bearing sheets for the Rock Island, Ill., arsenal, the same mill also taking strip steel included in the same inquiry, closing March 28.

St. Louis—Spot purchasing of sheets is reported in considerable volume, and higher prices have served to stimulate contracting second quarter. Business in the lighter gages is relatively much more active than in the heavier gages.

Railroads

Track Material Prices, Page 57

No action has been announced on the price of steel rails, $36.375 per ton, which expires April 15. Some sellers believe it will be extended for another month, while others point to advances in other steel products as an indication of an advance in rails also.

If railroads are not forced to grant wage increases it is believed rail purchases this year will exceed the 844,525 tons to be financed by the government, of which more than 500,000 tons already have been purchased. Some roads are known to be preparing to make purchases with their own funds, and it is believed that under favorable labor and government policies, an additional 700,000 tons may be ordered. Railroads are actually in need of 2,500,000 tons. Nickel Plate may inquire soon for 20,000 tons of rails and a tonnage of accessories.

Lackawanna is expected to close its inquiry for more than 500 freight cars and 20 locomotives and the Seaboard Air Line 1000 double sheathed steel box cars, received specifications being issued on the latter. New inquiry includes 600 steel containers for a less-carload corporation and ten passenger cars for the Gulf, Mobile & Northern, which is expected to inquire shortly for 200 freight cars, 150 of one type, 50 of another. Central of Georgia plans to inquire for 200 hoppers of 70 tons capacity in addition to its 200 of 50 tons capacity. Boston & Maine is inquiring for 5 or 10 locomotives.

Pittsburgh & Lake Erie will open bids April 20 for second quarter requirements of car and locomotive axles and tubes. The Pennsylvania has awarded a round tonnage of wheels. Baltimore & Ohio is issuing specifications for 35,000 tons of rails and over 15,000 tons of fasteners.

PWA loans approved include $4,935,000 to the Great Northern for road improvements and car repairs, $9,760,000 to the Pennsylvania as third installment on its electrification work, $1,716,000 to Chicago, Milwaukee, St. Paul & Pacific for 50 passenger and 25 baggage-express cars, $588,000 to the Lehigh Valley for car and locomotive repair, $1,200,000 to the Chicago Great Western for purchase of 500 new steel box cars, $500,000 to Central of Georgia for 200 new coal cars, $235,000 to the New York, Ontario & Western for 4725 tons of rails, with accessories.

An advance in prices of track fastenings is expected, following higher prices for steel from which they are made. Spikes, tie plates and track bolts seem likely to go higher.

Car repair work is getting under way generally and this is increasing specifications for materials for this purpose. Passing of winter is also increasing tracklaying, with a consequently heavier demand for rails and fastenings.

Companies recently noted as participating in the New York Central distribution of track fastenings and accessories are American Fork & Hoe Co., Lorain Steel Co., the Illinois Malleable Iron Co., Cleveland Frog & Crossing Co., Weir Kilby Corp., Ramapo Ajax Corp., P. & M. Co., William Harton Jr. Co. Woodings Forge Tool Co., Rail Joint Co., Youngstown Sheet & Tube Co., Weirton Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp., and the Inland Steel Co.

Freight car awards in March were

small, totaling 30. Coaches bought in March numbered 125. Comparisons with previous months are as follows:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	19,725	0	35	50
March	30	5	105	2,166
3 mo.	19,907	8	299	2,316
April	.....	50	0	2,798
May	.....	8	60	20
June	.....	500	0	1,910
July	.....	306	25	617
Aug.	.....	202	5	1,304
Sept.	.....	23	1,298	703
Oct.	.....	514	0	980
Nov.	.....	533	2	35
Dec.	.....	316	50	11
Total	.....	2,460	1,739	10,694

Car Orders Pending

Central of Georgia, 200 70-ton hoppers, in addition to previous inquiry for 200 50-ton hoppers.

Chicago Great Western, 500 steel box cars; PWA loan approved.

Gulf, Mobile & Northern, 10 passenger coaches; inquiry expected soon for 200 freight cars.

Locomotives Pending

Boston & Maine, 5 or 10 locomotives; bids asked.

Chief of engineers, one 8-ton gasoline mechanical drive locomotive for Camp Holabird; Vulcan Iron Works, Wilkes-Barre, Pa., low.

Rail Orders Pending

Maine Central railroad, 5200 tons.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 57

An advance in rivets from the present 2.75c, Pittsburgh or Cleveland and 2.85c, Chicago, probably will be made following $3 a ton increase on bars and $2 per ton on rods.

Both Pittsburgh Screw & Bolt Corp., Pittsburgh, and R. C. Mahon Co., Detroit, are low at $3.65 per 100 pounds on 30,000 rail clips for the department of street railways, Detroit. The same buyer reports Republic Steel Corp. is low at $5.35 per 100 on 30,000 short ¾-inch bolts. For the same project, bids on which were opened March 31, Inland Steel Co. is low at .5317c each for tie rods.

Some nut and bolt manufacturers at Cleveland have covered their trade's requirements fully for second quarter, but themselves are only partly protected for that period. Automotive specifications are heavier; railroad inquiries indicate larger buying shortly, while jobber demand is slow.

Shipments at Chicago are well maintained to most important consumers, with occasional gains noted in railroad needs. Equipment repair programs are commencing to develop

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FOR DIRECT EXPOSURE, UP TO 2475° F.—Armstrong's new EF Insulating Brick is a light weight refractory for use without fire brick protection, except where the brick will be exposed to abrasion or slagging action. Operation of a furnace built of EF Brick is speeded up since less time is required to bring the furnace to temperature. This is reflected not only in fuel saving, but also in increased volume production. Often a furnace built of EF Brick does the work of two of the older type.

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All standard fire brick shapes of Armstrong's, Nonpareil, and EF Brick are carried in stock. Other shapes up to 12″ x 24″ x 4½″ are manufactured to specifications.

Write for samples of any or all of the three Armstrong's Insulating Brick for test in your own plant. No obligation. Armstrong Cork & Insulation Co., 985 Concord Street, Lancaster, Penna.

Armstrong's
HIGH TEMPERATURE PRODUCTS
Armstrong's . . EF . . Nonpareil Brick

Shapes

Structural Shape Prices, Page 56

Pittsburgh — Although up until late last week no actual filing had been recorded on structural shapes, it was expected that a $3 a ton advance will be filed to become effective about April 16. Steel sheet piling prices, incorporating a $3 a ton advance at not only Pittsburgh but Chicago, Buffalo, and Gulf and Pacific coast ports, were filed April 6 to become effective April 16. The new price on piling at Pittsburgh therefore will be 2.15c base. Structural inquiry is made up mainly of state highway bridges, and the largest contract booked during the week was 3780 tons which American Bridge Co. closed recently for a railroad bridge at Cairo, Ill.

Cleveland—Shape producers offered to protect fabricators last week for 60 days on specific jobs, in advance of the price rise to be effective this week, but few projects are being figured in this district. Bids went in on a 150-ton state bridge at Brewster, N. Y., and some miscellaneous railroad bridge repairs.

Chicago — Shape awards and inquiries the past week were the smallest so far this year. Except for bridges, public works projects are light and private construction, the volume of which is increasing slowly, involves only small lots. A small tonnage is pending for World's fair buildings.

Boston — Considerable structural tonnage is being figured in New England, including federal aid projects and bridges. Buyers in some instances are covering on specific projects.

New York — Structural steel demand is dull with inquiry light, indicating no immediate improvement. A few projects taking 300 to 500 tons are active, notably schools at Dobbs Ferry and Greenwich, Conn. Revised plans for the Triboro bridge are holding up new contracts for that work and eliminating an estimated 10,000 tons from the structure.

Philadelphia—An advance of $3 a ton on shapes will establish the market at 1.95c, Bethlehem, or 2.05½c, Philadelphia. Bids were opened last week on a substantial tonnage of shapes and piling, and also reinforcing bars for one section of the Camden aproach to the high-speed line over the Delaware river bridge. New bids will be asked by the Pennsylvania railroad April 11 on its Anacosta river bridge, requiring 850 tons, and bids will be opened April 13 on 1750 tons for a state bridge in Forest county, Pennsylvania. Buying includes 1000 tons of sheet piling for Cape May, N. J.

Contracts Placed

1800 tons, mill buildings for Wheeling Steel Corp., Yorkville, O., to Fort Pitt

Shape Awards Compared

	Tons
Week ended April 7	6,021
Week ended March 31	11,138
Week ended March 24	25,179
This week in 1933	8,545
Weekly average for 1933	15,413
Weekly average 1934	7,424
Weekly average, March	18,349
Total to date 1933	153,456
Total to date 1934	240,318

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Bridge Works, Pittsburgh.

1000 tons, steel piling, Cape May, N. J., throuh Canuso Contracting Co., Philadelphia, to Jones & Laughlin Steel Corp., Pittsburgh.

600 tons, fertilizer works, nitrate plant No. 2, Sheffield, Ala., Tennessee Valley authority, to Bethlehem Fabricators Inc., Bethlehem, Pa.; Stone & Webster Engineering Corp., Boston, engineers; bids March 23.

500 tons, cranes for navy yard, Bremerton, Wash.; to Judson-Pacific Co., San Francisco.

420 tons, plant addition, Chicago, Campbell Soup Co., to American Bridge Co., Pittsburgh.

350 tons, bridge superstructure, Washington street, West Newton, Mass., for Boston & Albany railroad, to Phoenix Bridge Co., Phoenixville, Pa.

300 tons, piling, Riverside-Delanco bridge, Burlington county, New Jersey, awarded through Colyn Construction Co., Philadelphia, to Kalman Steel Corp., Bethlehem, Pa.; approximately 150 tons of shapes to be awarded shortly.

250 tons, warehouse, Fleck Bros., Jenkinstown, Pa., to Frank M. Weaver & Co. Inc., Lansdale, Pa.

200 tons, highway bridge, Rivanna river, Virginia, to Roanoke Iron & Bridge Co., Roanoke, Va.; Chisholm & Moore Inc., Charlottesville, Va., general contractor.

160 tons, bridge, NRH-421-H, Potter county, Texas, to Austin Bros., Dallas, Tex.

154 tons, state bridges in Lincoln, Garfield and Bent counties, Colorado, to unnamed interest.

150 tons, Dry creek bridge for Santa Rosa county, Healdsburg, California., to Judson-Pacific Co., San Francisco.

150 tons, 33 lookout towers for United States forest service, Oakland, Calif., to Pacific Coast Steel Corp., San Francisco.

150 tons, building, H. J. Heinz Co., Medina, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

145 tons, warehouse, Claremont, Calif., to Consolidated Steel Corp., Los Angeles.

140 tons, bridge, Jersey City, N. J., Central Railroad of New Jersey to Phoenix Bridge Co., Phoenixville, Pa.

125 tons, sewage disposal plant, Milwaukee, to Worden-Allen Co., Milwaukee.

125 tons, bridge, Marion county, O., to Independent Bridge Co., Pittsburgh.

105 tons, state crossing in Adams county, Colorado; to unnamed interest.

100 tons, gate track replacements, lock 32, Ohio river, to American Bridge Co.; bid to United States engineer, Cincinnati, March 13.

Unstated tonnage, Cypress Creek bridge, Gulf county, Florida, to Bethlehem Fabricators Inc., Bethlehem, Pa., and Truscon Steel Co., Youngstown, O.

100 tons, building, Canadian Wineries Ltd., Lewiston, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, building, World's fair, Chicago, for Hiram Walker & Sons, to Gage Structural Steel Co., Chicago.

100 tons, bridge, Bartlett, Ill., to Mississippi Valley Structural Steel Co., Chicago.

100 tons, bridge, Le Flore county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

100 tons, state bridge, Cambridge, O., 75 tons of shapes and castings to Fort Pitt Bridge Works, Pittsburgh; 25 tons of concrete bars to unstated interest.

Contracts Pending

2452 tons, shapes for coast guard cutters, opening at Washington, April 6, under schedule 2052, including 1377 tons black and 1075 tons galvanized.

1750 tons, state bridge, route 750, Forest county, Pennsylvania; bids April 13.

1300 tons, county bridge, Georgetown, S. C.

1000 tons, Bonneville dam project; bids about May 15 to United Stats engineers, Portland, Oreg.; (sheet piling).

850 tons, Pennsylvania railroad bridge, over the Anacosta river, near Washington; new bids to be asked April 11.

750 tons, three highway bridges, Colorado.

600 tons, suspension bridge, Grand Coulee dam, Washington.

550 tons, fleet airplane base, Pearl harbor, Hawaii; navy asking bids.

400 tons, pier No. 3, Fort Mason, Calif.; general contract to K. E. Parker Co., San Francisco.

400 tons, packing house, World's fair, Chicago.

378 tons, double truss bridge, Clarion and Armstrong counties, Pennsylvania; bids April 20.

350 tons, Museum of Fine Arts, Rich-

Machined part with half-shell section, ⅜" x 2⅛", made from Ultra-Cut Screw Stock at 100% increased rate of production.

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mond, Va.; Doyle & Russell, Norfolk, Va., low.

300 tons, extension federal warehouse, Washington; bids April 10; more than 1000 tons of rail steel bars also required.

275 tons, grandstand, Rochester, N. Y., federal relief project.

275 tons, station, Pennsylvania, Reading Seaboard railroad, Atlantic City, N. J.; bids asked.

275 tons, building, Agar Mfg. Co., Whippany, N. J.

260 tons, state bridge, route 757, Cammal, Pa., in Lycoming county; bids to be opened April 13.

250 tons, highway bridge, Hot Sulphur Springs, Colo.

250 tons, highway bridge, La Crescent, Minn.

250 tons, plant addition, American Can Co., Austin, Ind.

250 tons, distillery, Peoria, Ill.

250 tons, bridge, La Crescent, Wis.

230 tons, highway structures, Mississippi; bids April 10.

200 tons, school, Greenwich, Conn.

200 tons, highway bridge, Brewster village, N. Y.

195 tons, state highway bridge, Brewster, N. Y.

182 tons, also 45 tons of reinforcing and castings, state undercrossing, Spokane county, Washington; general contract to Andrew Sather, Seattle.

150 tons, artillery gun sheds, Natick, Mass.

150 tons, state bridge, Lewis county, Washington; general contract to West Coast Construction Co., Seattle.

150 tons, highway projects, including bars, Alabama; bids April 12.

145 tons, highway bridge, Strong river, highway 49, Simpson county, Mississippi.

130 tons, also 25 tons of reinforcing, state bridge Green river, King county, Washington; general contract to West Coast Construction Co., Seattle.

110 tons, school, Newton, Mass.

Unstated, Northern Pacific railroad bridge, over Cowlitz river, Washington; plans approved, bids soon.

Unstated, 110 foot survey vessel for United States engineers, Portland, Oreg.; plans in preparation.

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PHILADELPHIA DIVISION Philadelphia, Pa., U. S. A.
Makers of Yale Hand and Electric Chain Hoists and Trolleys

Reinforcing

Reinforcing Bar Prices, Page 57

Pittsburgh — Up until late last week no change had been indicated for the market on reinforcing steel bars which continues 1.90c base, Pittsburgh, for cut lengths, although it is expected that an advance will be announced shortly. Leading among new inquiries is 3500 tons for Wiota dam, Fort Peck, Mont., about 1800 tons for the Coos bay bridge, Oregon, on which tentative bids will close April 26, and on a large but unstated tonnage for the federal warehouse at Washington.

Cleveland—Inquiries for concrete bars have fallen off since the CWA went out of existence April 1, only work previously started by this administration now being carried on. Private work also is lacking. Concrete bars are expected to be advanced $3 a ton this week, with the $3 rise in commercial steel bars.

Chicago—Concrete bar orders total 2000 tons, the largest of which is 800 tons for a store here for Sears, Roebuck & Co. Awards for Illinois highway bridges involve 600 tons

Concrete Awards Compared

	Tons
Week ended April 7	5,592
Week ended March 31	12,405
Week ended March 24	4,391
This week in 1933	1,709
Weekly average for 1933	3,771
Weekly average 1934	4,755
Weekly average March	6,313
Total to date 1933	50,413
Total to date 1934	71,336

while the Illinois Central railroad has placed 400 tons for miscellaneous purposes. Occasional gains in inquiries for private construction usually account for only small lots. Bar shipments for road building are expected to increase soon with the advent of more favorable weather. No price changes as yet have been announced.

Boston—Reinforcing steel requirements are heavier, notably for state highway and bridge work in Massachusetts, bids closing this week. The federal PWA program is gradually gaining momentum in New England. Higher prices are expected shortly on new work, with buyers protected on specific projects already figured.

New York — Concrete reinforcing bars are expected to advance $3 a ton shortly, although no definite action has yet been announced. Highway mesh is also likely to be marked up. Inquiry in this district is quieter, and awards are light.

Philadelphia — Reinforcing bar prices are expected to follow the $3 advance in commercial steel bars. Such increase would place billet steel, cut lengths, at 2.05c Pittsburgh, or 2.34c Philadelphia. More than 1000 tons of rail steel will be required for a federal warehouse project in Washington.

Contracts Placed

1020 tons, Nogales conduit, specification NFC-3, Nogales, Ariz., to Allison Steel Mfg. Co., Phoenix, Ariz

1012 tons, Seattle seawall improvement, divided between Northwest Steel Rolling Mills and Pacific Coast Steel Corp., Seattle.

800 tons, store, Sears Roebuck & Co., Chicago, to American System of Reinforcing, Chicago.

600 tons, highway bridge, Illinois, to Calumet Steel Co., Chicago.

400 tons, Illinois Central railroad, divided among several distributors.

300 tons, race track buildings, Arcadia, Calif., to unnamed interest.

196 tons, state highway work, Adams, Bent, Garfield and Lincoln counties, Colorado, to unnamed interests.

175 tons, Boulder dam, Boulder City, Nev., to unnamed interest.

161 tons, overhead span and substructure, Tollgate, Richie county, West Virginia, to Jones & Laughlin Steel Corp., Pittsburgh; J. M. Francesa & Co., Fayetteville, W. Va. American Bridge Co., Pittsburgh, awarded 75 tons of structural steel.

150 tons, Fort Lewis construction and Douglas, Alaska, bridge, to Pacific Coast Steel Corp., Seattle.

150 tons, Boulder dam, specification 23096-A, Boulder City, Nev., to unnamed interest.

120 tons, state road work, Lackawanna county, Pennsylvania; through F. D. Kissler Co., general contractor, to the Kalman Steel Corp., Bethlehem, Pa.

108 tons, including 96 tons of bars and 12 tons of shapes, dormitories, Oklahoma College for Women, Chickasha, Okla., to Capital Steel & Iron Co., Oklahoma City, Okla.; Denehy Construction Co., Oklahoma City.

100 tons, Boulder dam, proposal 23058-A, Boulder City, Nev., to unnamed interest.

100 tons, plant addition, Viscose Co., Lewistown, Pa., through Wark & Co., Philadelphia, general contractor, to Concrete Steel Co., New York.

100 tons, plant building, Davenport, Iowa, to Calumet Steel Co., Chicago.

100 tons, reservoir, Ft. Atkinson, Wis., to Inland Steel Co., Chicago.

Contracts Pending

1000 tons, or more, United States government warehouse, Washington.

275 tons, state bridge and road work, Monroe county, Pennsylvania; bids asked.

260 tons, El Capitan dam spillway extension, San Diego, Calif., bids in April 9.

180 tons, highways and bridges, Mississippi; bids April 10.

125 tons, building, state hospital, Waltham, Mass.; bids April 10.

105 tons, store house, Gardner, Mass.

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Pipe

Pipe Prices, Page 57

Pittsburgh—Inquiry is expected for almost 1,300,000 feet of gas line pipe in a 240-mile line serving Detroit, Pontiac, Mich., and Flint, Mich., with natural gas. The cost of the project is estimated at $4,500,000 and the sponsor, is the Industrial Natural Gas Pipe Line Co., New York, A Thomas Sarkisson president. A hearing before the Michigan public utilities commission is expected shortly. Frick-Reid Supply Corp., Pittsburgh, on readvertised bids, has been awarded contract for 21,000 feet of ½ to 4-inch black and galvanized steel pipe for the Pittsburgh federal engineers, this material to be used in the Montgomery locks on the Ohio river below Pittsburgh.

An advance in pipe prices probably will be announced soon and in view of the $2 a ton advance in skelp it is likely that the advance in pipe will be one of at least two to three discount points.

Chicago—Cast pipe orders are unimproved, purchases on most of the active projects still being delayed. Some shipments against old orders are being released but in other instances producers are prevented from making deliveries by the lack of government approval of specifications. Milwaukee has placed 770 tons of 12 and 20-inch pipe. Higher prices on cast pipe are seen as probable, in view of impending advances in pig iron.

Boston—Cast pipe volume has declined with buying largely confined to small lots. The New England foundry has a fair backlog. Demand for steel pipe is sluggish.

New York—Cast pipe buying for federal aid projects was heavy last week, totaling about 2400 tons with the largest requirements for Rochester, N. Y. For New York city several eastern foundries divided 500 tons. Inquiry, however, is lighter.

Philadelphia—The city is inquiring for approximately 200 tons of seamless tubing. Higher cast pipe prices are seen as a result of increases in pig iron quotations.

Cincinnati—United States Pipe & Foundry Co., Burlington, N. J., was low bidder at $64,287.60 for an unstated tonnage of miscellaneous cast pipe for the Cincinnati waterworks. The same company also will supply 2200 tons of cast pipe for 36-inch mains on a general contract awarded at $287,612.90 to M. F. Quill & Son.

Birmingham, Ala. — While pipe plants are operating around 50 per cent capacity, the market is not active. Shipments are steady. Raw material stocks are low.

Cast Pipe Placed

2200 tons, 36-inch, Cincinnati watermains, to United States Pipe & Foundry Co., Burlington, N. J.; M. F. Quill & Son, general contractor.

1750 tons, Rochester, N. Y., including about 1500 tons of 6-inch and 250 tons 24-inch and under, to United States Pipe & Foundry Co., Burlington, N. J.; federal aid project.

770 tons, 12 to 20-inch, Milwaukee, to United States Pipe & Foundry Co., Burlington, N. J.

500 tons, New York, federal aid project, divided among several eastern foundries.

262 tons, 12-inch, class 150, Hayward, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

225 tons, 6-inch, Meriden, Conn., to R. D. Wood & Co., Philadelphia.

125 tons, 6 to 12-inch, Bellingham, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

100 tons, 4 and 6-inch, for Camp Mur-

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ray, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

750 tons, 21-inch and 28-inch discharge pipe, Fort Peck dam project, Montana, to McClintic-Marshall Corp., Bethlehem, Pa.; bids March 26 with federal engineer's office, Kansas City, Mo.

Unstated tonnage, 1286 boiler tubes, navy, department of supplies and accounts, to Summerill Tube Co., Bridgeport, Pa., $7597.97, f.o.b. works.

Cast Pipe Pending

1100 tons, 4 to 12-inch, Pelham, N. Y.

450 tons, 16-inch, Juneau street improvement, Seattle; bids April 12.

216 tons, 6 to 16-inch, class 150, Roseville, Calif.; bids in.

160 tons, 24-inch, outfall sewer, Asbury Park, N. J.; bids April 10, with alternates on wrought iron.

140 tons, Monterey, Calif.; bids in.

Steel Pipe Pending

Unstated tonnage, 8300 feet of 85/8-inch, 10,000 feet of 65/8-inch, temporary water system, Fort Peck dam, Montana; bids to United States engineer. Kansas City, Mo.; Joseph Greenspons & Son Pipe Corp., St. Louis, low.

Pig Iron

Pig Iron Prices, Page 58

Pittsburgh—With the expectation that an advance of $1 a ton would be made in pig iron, the foundry trade last week showed more life than in months. Actually, an advance was filed late in the week, boosting the Neville Island price on basic $1 a ton to $18 and raising foundry and malleable grades 50 cents a ton to $18.50 and bessemer 50 cents a ton to $19. In addition, two of the district's largest nonintegrated steel mills came out with inquiries. One was preparing to close last week on an unstated tonnage of basic and bessemer pig iron, its first purchase of iron since July, 1932. Pittsburgh steel foundries have been increasing schedules and consequently accepting heavier shipments of iron. Last month a further lot of 7800 tons of bessemer iron was received by A. M. Byers Co. on a recent order.

Cleveland — Pig iron prices have been advanced $1 a ton by Cleveland interests. Melters have covered for most of their second quarter requirements. Current sales during the week held to recent levels, while shipments continued moderately upward.

Chicago—Pig iron prices have been marked up $1 a ton. Advances in costs, largely as a result of recent wage increases, have amounted to $1.50 to $2 a ton. Recognizing the possibilities of an early price increase, consumers recently have been active in covering second quarter requirements. Tonnages involved have been heavy and point to a definite increase in second quarter shipments compared with the past three months. New contracting recently has been at $17.50, furnace, for No. 2 foundry and malleable.

Boston—Advance in prices following higher coke, coal and material prices is expected. Shipments are light in New England. Resumption of operations of a Troy, N. Y., furnace May 1 holds interest in this territory as the output may be competitive in New England.

New York—Advance of $1 a ton on all grades at Swedeland, Pa., effective around April 15, is expected to be followed by similar increases at other eastern basing points. Contracting is more active, although spot business continues to lag.

Philadelphia—Protective covering is noted generally in the local market, with the trade more convinced than a week ago that higher prices

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will develop, particularly in view of the increase of 35 cents a ton in coke, which became effective April 1. The Swedeland, Pa., furnace, banked a few weeks ago will likely resume production within the next fortnight.

Buffalo—Demand has again spurted following advance in prices. Consumers are covering beyond this quarter in many instances planning to take shipments in June. March deliveries from local sources exceeded those of January by 150 to 200 per cent, it is claimed.

Cincinnati — Buying is more active, but remains close to assured needs, despite reports of price advances. Shipments are better, reflecting depletion of accumulated stocks.

St. Louis—Reduction of stocks and expectations of advancing prices have stimulated the market. Sales of all grades in the past two weeks are estimated as high as 18,000 tons. Improvement in demand has extended to malleable foundries.

Birmingham, Ala.—In the face of advancing prices, melters are contracting for more iron for second quarter delivery. Ten blast furnaces are blowing, mainly on basic.

New price has been filed on southern No. 2 iron of $14.50, base, effective in 10 days. Increase amounts to $1 a ton.

Toronto, Ont.—Demand for merchant iron is sustained and new business is appearing in better volume. Mill consumption of basic iron is down largely due to suspension of operations at the Sydney, N. S., rail mill. Only one furnace out of 11 is blowing in Canada.

Scrap

Scrap Prices, Page 59

Cleveland—While the scrap market here and in the valleys is quiet strength is apparent in prices and general conditions. Movement of scrap by lakes probably will start soon as ice is clearing and accumulations on dock await only open water. Heavy buying of scrap by steelmakers has been under way and some have covered their needs for a considerable period. At Pittsburgh about 20,000 tons has been covered, a Buffalo interest has contracted for about 50,000 tons and a western melter has taken 50,000 to 60,000 tons. Other tonnages have been contracted within the past week and observers with a wide outlook have estimated that total recent sales have aggregated close to 500,000 tons.

Pittsburgh — The leading interest here broke a period of some two months absence from the market April 2 by buying approximately 20,000 tons of heavy melting steel scrap for delivery to both Union railroad points and Vandergrift, Pa. Prices paid fell directly within the present market quotation of $14 to $14.50. Scrap for the Union railroad points was purchased at $14.25 and for Vandergrift at $14.75 although, as is always understood, the latter shipping point commands a slight premium.

Chicago—Several mills entered the market the past week and sales were the heaviest so far this year. Buying was sufficient to cover requirements of most large consumers for 60 days. Prices are unchanged, recent purchases leaving the market on heavy melting steel $11.50 to $12, although dealers have lowered their buying prices.

Boston — Heavy melting steel is stronger, dealers having advanced buying prices 25 cents a ton. Steel car axles and scrap rails are also firmer. Scrap which has been difficult to move in Northern New England is beginning to come out.

New York—Scrap prices are firm with demand more active. Additional eastern mills are taking shipments. The Buffalo consumer of heavy melting steel continues to buy for barges at unchanged prices.

Philadelphia — While orders are still lacking, sentiment in the local scrap market is stronger than a week ago. With few exceptions, delivered eastern Pennsylvania prices are unchanged. It is claimed that any large inquiry would immediately boost No. 1 steel at least 50 cents a ton, to $12, delivered. Meanwhile, the leading consumer in the Baltimore district has reduced his offering price on No. 1 heavy melting steel another 50 cents a ton, to $9.50, f.o.b., Baltimore, the second reduction within two weeks.

Washington — Purchasing officer, Panama canal, closes bids April 23 here on 10,000 tons of iron and steel scrap, 503 tons of cast iron car wheels and 79 tons of steel car wheels.

Buffalo—Principal consumers now offer $12.50 for No. 1 heavy melting steel following purchases of more than 50,000 tons at $13. Dealers are not selling in volume. Machine shop turnings have turned weaker with the closing of one principal outlet for an indefinite period.

Detroit—On important grades, including heavy melting steel and hy-

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draulic compressed sheets, the market weakened 25 cents a ton last week with offerings considerably heavier than local demand. Typical of heavy scrap lists was that of a small independent automobile concern which closed on 5000 tons of compressed sheets and that of a larger automobile maker which sold about 15,000 tons of various grades.

Cincinnati — Quotations on iron and steel scrap are nominally unchanged. Buying prices are still low enough to enable sales to Valley mills, which have lifted shipping restrictions.

St. Louis—The market for iron and steel scrap has reached a temporary impasse and while melters are anxious to buy, their offers are not adequate to dealer views, and sales are light.

Birmingham, Ala. — While prospects are brighter as greater activity is anticipated at several foundries, the scrap market has changed little and quotations remain steady.

Toronto, Ont.—General business in iron and steel scrap shows little change. Steel mills are again out of the market and shipments of heavy melting steel and turnings are negligible.

Strip Steel

Strip Prices, Page 57

Pittsburgh—Last week a $5 a ton increase in hot-rolled strip steel at Pittsburgh was filed to become effective next week, thus placing the market at 2.00c base, Pittsburgh. At the same time an $8 a ton increase was filed for cold-rolled strip which advances the market on the latter from 2.40c, Pittsburgh, to 2.80c, Pittsburgh. Consequently, requests for contract coverage have been heavy the past week and specifying against these contracts is likely to be of abnormal proportions as the second quarter progresses.

Cleveland—More consumers have contracted for hot and cold-rolled strip for second quarter than the number who covered for first quarter, with some leading sellers here. Tonnage reserved by automotive interests is about equal to that engaged for first quarter. Practically all users took advantage of the opportunity to protect requirements in advance of the $5 a ton increase on hot strip and $8 on cold strip, which goes in effect this week. Mill operations are steady, but are not scheduled more than two or three weeks ahead.

Chicago—The advance of $5 a ton to 2.10c, Chicago, in hot strip has given a further stimulus to second quarter contracting. Larger consumers are protected by contracts at 1.85c, with tonnages booked in some instances sufficient to accommodate users beyond this quarter. Cold-rolled strip, recently 2.40c, Pittsburgh-Cleveland, has been advanced to 2.80c. Automotive shipments are fairly steady.

Boston—Contracting for hot and cold-rolled strip was heavier with consumers covering for the remainder of the quarter before higher prices became effective. Sellers, however, discouraged too heavy buying, especially speculative purchasing.

New York—With an increase of $8 a ton in effect at Pittsburgh April 12 on cold-rolled strip and $5 April 15 on hot strip, consumers are rushing to cover, although spot buying has shown only a modest increase.

Philadelphia — With hot strip scheduled to go to 2.00c, Pittsburgh, and cold strip to 2.80c, an increase of $5 and $8 a ton, respectively, consumers are contracting freely. Actual specifications show no gain.

Cold Finished

Cold Finished Prices, Page 57

Pittsburgh—Change from 2.10c, Pittsburgh on cold-finished carbon steel bars likely will not be made at present. Because most nonintegrated cold-drawn bar producers are now fully covered at 1.70c, Pittsburgh, on hot-rolled bars and the advance in the latter to 1.85c does not become effective for them until July 1, it is expected that an advance in cold-drawn will be delayed until late in this quarter or early in July. The same condition holds for turned and ground shafting, on which base prices at Pittsburgh continue unchanged.

Wire

Wire Prices, Page 57

Pittsburgh—An advance in all wire products was announced last week placing the market $2 to $5 a ton above present base prices. The following products were advanced $5 a ton: common standard wire, cement coated and galvanized nails, polished and galvanized staples, and barbed wire. The following wire products were advanced $3 a ton: annealed fence wire, galvanized fence wire, woven wire fencing, plain bright wire, and spring wire.

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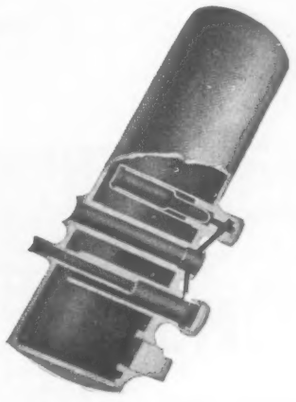

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wire and wire products tonnage expected by leading producers in second quarter has been covered by contracts as consumers last week bought in advance of the $3 a ton rise in plain wire prices and $5 a ton in wire products. Specifications also improved. Some consumers of wire rods who previously placed contracts sought to raise the tonnage when the new prices were filed. They found mills either booked up, or unwilling to obligate themselves with additional tonnage.

Chicago—Price increases of $3 to to $5 a ton, effective late this week, have stimulated second quarter contracting further and most large users have protected themselves on requirements over the coming three months. In some instances tonnages contracted for will accommodate consumers beyond this period. Wire nails now $2.40 have been raised to $2.65, Chicago, with plain wire 2.40c, up $3, and wire rods $39, up $2.

Boston—Wire demand, recently showing improvement, has been further stimulated by contracting through the remainder of the quarter before the price advance on plain, spring and other wire products, including nails, became effective. Heavier wire drawing operations during the next few weeks are indicated.

New York—Advances in wire products of $3 to $6 a ton is stimulating contracting, with spot releases increasing slowly.

Warehouse

Warehouse Prices, Page 60

Pittsburgh—Demand for steel warehouse the first week of April declined slightly from the previous week. Jobbers are expected to stock heavily on present prices as warehouse prices may be expected to follow mill advances soon.

Cleveland—As warehouse prices are predicated on mill prices, with a fixed differential, advances to be inaugurated this week by producers are expected to be reflected immediately in warehouse quotations. Orders and shipments in March averaged better than February for the same number of days, and April, so far, continues the improvement.

New York—Warehouse prices on steel products are expected to advance in line with recent mill increases, but when such higher prices become effective is uncertain. Volume has gained materially, largely through an increase in small orders.

Philadelphia—Jobbers look for an increase in warehouse prices, possibly this week, as a result of advances by mills. These prospects, combined with milder weather conditions, have stimulated buying recently.

Detroit—Early April demand for steel from warehouse is sustaining the high March rate, the best month this year. Although prices hold unchanged, the expectation of a higher market is current in view of recent steel price advances by mills.

Cincinnati—Orders from warehouse are more numerous with total tonnage at the advanced rate of March. Prices have not yet been advanced as a sequel to mill increases.

St. Louis—Business of iron and steel warehousemen in this area is enlarging the gains achieved during the past six weeks. Shipments to customers outside of the St. Louis industrial district show relatively greater improvement than local deliveries.

Metallurgical Coke

Coke Prices, Page 57

Effective April 2, all grades of coke for spot shipment have been advanced 35 cents a ton, thus placing Connellsville furnace coke at $3.85, ovens, with the usual differential applying for yearly contracts. The market on the latter has been increased to $3.60. Foundry coke under the operation of this advance is now $4.60, ovens, and premium grades of foundry coke are now quoted $5.35.

Foundry coke demand is heavy at Pittsburgh and the disposition on the part of some melters toward stocking more fuel is continuing apparent.

By-product foundry coke prices have been extended into April at $8.50, ovens, for outside delivery and $9.25, delivered Chicago, unchanged from March.

Demand for by-product foundry coke at Cincinnati is well sustained at the increased rate of shipments during March. Adjustments influenced by coal and labor costs may be expected about May 1.

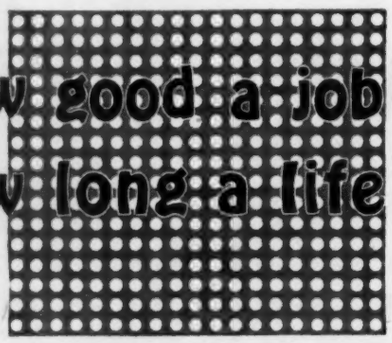
Quicksilver

New York—Quicksilver prices are firmer here on fair sales during the past week. Small lots are $76.50, a virgin flask of 76 pounds, and round lots $76.

Semifinished

Semifinished Prices, Page 57

Since the filing of a $3 a ton increase in rerolling billets, blooms and slabs last week and a $4 a ton advance in sheet bars, effective this week, contracting and specifications have been increasing in these products. The new price on billets, slabs and blooms will be $29, Pittsburgh, for all orders not under contract by April 10. The sheet bar market will be $30, Pittsburgh.



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Skelp is being advanced $2 a ton to 1.70c, Pittsburgh, but no filing has as yet been made on tube rounds. Wire rods are up $2 a ton to $38, Pittsburgh, effective with April 14.

Pacific Coast

Pacific Coast Prices, Page 57, 58, 60

San Francisco—(*By Air Mail*)—Further improvement in demand for steel products on the Pacific coast is noted and awards were fairly numerous. The largest award was placed with the Allison Steel Mfg. Co., Phoenix, Ariz., for 1020 tons of reinforcing bars for the Nogales conduit at Nogales, Ariz.

Awards of reinforcing bars were the third largest of any week so far this year and aggregated 2389 tons, bringing the total to date to 23,829 tons, compared with 9329 tons for the same period a year ago. Soule Steel Co., San Francisco, has secured 176 tons for Boulder dam. Unnamed interests took 300 tons for racetrack buildings at Arcadia, Calif., and 196 tons for highway work in Colorado.

Southern Pipe & Casing Co. took 290 tons of 22-inch pipe for the Metropolitan water district, Los Angeles, and Pacific Coast Engineering Co. booked 150 tons for pontoon pipe for United States engineers at Sacramento, Calif. Bids open April 23 for 2500 tons of liner plates and structurals for the metropolitan water district, Los Angeles, and April 14 for 2000 tons for an 84-inch pipe line at Monte Vista, Colo.

Judson-Pacific Co., San Francisco, secured 150 tons for the Dry creek bridge at Healdsburg, Calif. Consolidated Steel Corp., Los Angeles, took 145 tons for a lemon warehouse at Claremont, Calif. Bids will be opened April 25 for 350 tons for a store house extension at Pearl Harbor, T. H. Bids have been opened on 128 tons for a bridge in Pueblo County, Colo., and on 120 tons for an underpass in Uinta county, Wyo.

The only cast iron pipe award went to American Cast Iron Pipe Co., 262 tons of 12-inch pipe for Haywards, Calif. Roseville, Calif., opened bids April 5 for 216 tons of 6 to 16-inch pipe, and Monterey, Calif., April 2 for 140 tons. Long Beach, Calif., has placed 280 tons of seamless gas line pipe with various distributors in the Los Angeles district.

Many Projects Maturing

Seattle—For the city's seawall project, Seattle has awarded equally to Pacific Coast Steel Corp. and Northwest Steel Rolling Mills, Seattle, 1012 tons of reinforcing on a bid of $50,303. The low bid for bending was $5158. Pacific Coast Forge Co., Seattle, was low at $7154 for supplying 90 tons of threaded bolts. Western Steel Casting Co., Seattle, will furnish 160 castings for $2240.

Bids were opened this week for three state bridges involving 500 tons of shapes and 70 tons of reinforcing. Andrew Sather, Seattle, was awarded at $53,984 the Spokane county undecrossing; West Coast Construction Co., Seattle, obtained the Green river span at $44,000 and the Lewis county bridge at $36,284.

Pacific Coast Steel Corp., Seattle, booked 75 tons of sheet piling and an equal tonnage of reinforcing for a bridge at Douglas, Alaska, and 75 tons for a chapel and guard house at Fort Lewis, Wash.

Contract for 100 tons of 4 and 6-inch cast iron pipe for Camp Murray, Wash., went to United States Pipe & Foundry Co., Burlington, N. J. Seattle will open bids April 12 for the Juneau street improvement requiring 450 tons of 16-inch pipe.

Army engineers at Kansas City will open bids April 11 for 4943 tons of plates and 2946 tons of shapes for the Fort Peck, Mont., dam. About May 15, bids will be invited for 1000 tons of sheet piling for the Bonneville project. Bureau of reclamation figures show the following tonnages involved in the Coulee dam project on which bids are being taken: 11,050 tons of reinforcing, 343 tons of cast iron pipe and fittings; sluice gates, metal conduits, 4173 tons; trash rack and metal work, 558 tons; shapes, 534 tons.

Jobbing trade is active. No marked change is noted in the scrap market. There is slightly less interest in exports, due to stronger freight rates, which range from $2.50 to $3.50. No. 1 cast scrap, cupola size, remains firm at $8.50 to $8.75. Steel rails continue in good demand. Local consumption has increased slightly.

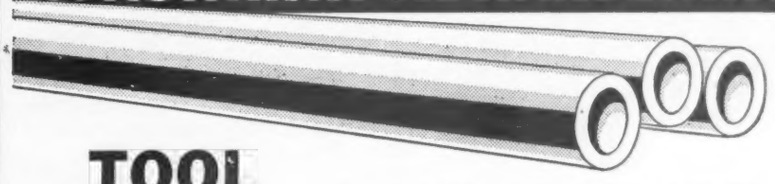
Steel in Europe

Foreign Steel Prices, Page 60

London—(*By Cable*)—Steel markets are steady and active in the Middlesbrough and Scottish districts and work has been resumed on the Cunard steamer which was interrupted several months ago. In the Midlands, trade is quiet and demand for finished steel is disappointing. Galvanized sheets and tin plate are further depressed. North British Locomotive Co., Glasgow, has booked an order from the South African Railways for 50 locomotives, at about £300,000, in face of stiff competition from the United States and the Continent.

Some export activity is reported from the Continent. France has booked a Russian tube contract and Belgium has taken further orders from Russia for plates and shapes. Berlin reports strong demand for structural steel.

NONSHRINK OIL HARDENING



TOOL STEEL TUBING

Manufacturers of BISCO Tungsten Carbide drawing dies for wire, rod and tubing.

A saving will be realized by using our Tool Steel Tubing. Carried in stock up to 12" O.D. x 2" wall thickness. Larger sizes can be supplied. This tubing is excellent for all classes of dies, slitters, spacers, bushings, etc.

We also supply a special tubing conforming in analysis to S.A.E. 52100 and S.A.E. 4615 designed particularly for Ball Bearing purposes. Can be furnished in Hot Rolled or Cold Drawn finish.

THE BISSETT STEEL CO., Inc.

945 East 67th St., CLEVELAND, OHIO

Cincinnati Worcester Buffalo

Equipment

Chicago—While occasional gains are noted in plant equipment sales, buyers still show some restraint in making major expenditures. Some of the larger industries, railroads in particular, are limited in their purchases by financial conditions and buying usually is confined to necessities. Steel plant improvements and installation of new facilities during the past year or two have been concentrated principally on the flat rolled departments, with little activity in steelmaking divisions.

Boston — Machinery builders in New England are fairly active in most instances and in a few cases schedules require double shifts. Demand is largely for special equipment. Textile mill equipment builders continue active, largely for replacement.

Pittsburgh—Activity among steel mill roll makers is especially noted at this time, also on various repair parts for district steel mills. There is little activity for the time being in the market for heavier steel mill equipment. Demand for steel ingot molds is heavy.

New York—Sellers of machinery and equipment continue to quote on a substantial volume of scattered inquiries, but orders are slow to materialize. A Springfield, Mass., manufacturer of electrical household appliances has bought considerable equipment, including automatic lathes. Navy inquiry and buying continues active with a much heavier volume about to come out for delivery at Brooklyn. Shaw-Box Crane & Hoist Co., Muskegon, Mich., has been awarded contract for a 10-ton crane, ordnance shop, Fort Monroe, Va.

Cleveland—Buying by automotive plants has quieted down for the time, but a fairly steady flow of orders is being received from miscellaneous users. Equipment sales are well over the rate of a year ago. Hold-ups on orders are fewer, one automobile interest having released some machinery, including lathes, placed in the Cincinnati district, but recently held up.

Ferroalloys

Ferroalloy Prices, Page 58

A further increase is noted in specifications for ferromanganese and spiegeleisen, with prices at $85, duty paid, eastern seaboard and $26, furnace, respectively, the latter applying to domestic material, 19 to 21 per cent.

Tin Plate

Tin Plate Prices, Page 56

Pittsburgh—Tin mill sizes of black plate have been advanced $4 a ton to 2.85c, Pittsburgh, for the 28 gage base. Standard tin plate, however, continues $5.25 per base box, with most tin mills two, three and four weeks behind on deliveries. The average of tin plate operations holds at 80 per cent.

An advance of $8 a ton on No. 24 long ternes has been filed to be effective April 14.

New York—Production of tin and terne plate in the United States increased 63,000 tons in March to the highest level for any previous corresponding month since 1931. The total of 164,000 tons for the month compared with 101,000 tons for February and 82,000 tons for March, 1933. March, 1932, production came to 93,000 tons. Business abroad has increased remarkably since abandonment of the gold standard last year.

Coke By-Products

Coke By-Product Prices, Page 57

New York—Benzol has been reduced 1½ cents a gallon for second quarter to 19 cents in tank car lots, freight allowed. For drum lots the price is 24 cents, f.o.b. works. Toluol and xylol are more active, with little material available for spot delivery. Naphthalene specifications also are heavier.

Nonferrous Metals

Nonferrous Metal Prices, Page 58, 59

New York—A generally improved situation developed in the nonferrous metals last week. Prices were higher and demand in larger volume.

Copper—Prices advanced ¼-cent late in the week following a rush of consumers to cover on requirements in anticipation of higher levels under the code for the industry, which now is practically ready for signing. Predictions are to the effect that the metal will reach 9.00c shortly and may go higher later.

Lead—Demand was in substantial volume for both April and May shipment. Leading sellers reported sales more than balanced ore intake. The market apparently was in a position for a price advance.

Zinc—The market firmed up following recent easiness with most sellers quoting prime western 4.35c, East St. Louis, as the week closed. Galvanizers took 145,007 tons of zinc in 1933 compared with 107,400 in the preceding year.

Tin—Prices shot up sharply in the London market late in the week and carried domestic levels to the highest points in several months. Consumers were actively in the market.

Antimony — Quotations advanced steadily during the week to around the 8-cent level. Considerable small-lot business was done.

Aluminum—A moderate improvement in demand was noted. Remelt grades appeared steadier.

NRA

(Concluded from Page 14)

Peter A. Frasse Co., on commercial sections, including basing points, extras, and deductions.

George Dix, Steel Union Co., importer of German steel, protested provisions which require all importers to comply with the warehouse code and to mark all imported steel and show it as such on invoices. He would have steel importers operate under the general importers' code.

Roscoe Ewing, representing the National Association of Distributors of Secondary Steel Products, said members of his organization did not wish to be included under the steel warehouse code which he asked be revised to cover prime material only. Morris Wheeler, Morris Wheeler & Co., asked that discounts be made a matter of local adjustment instead of uniform 0.50 per cent for the entire country.

¶Little progress was made at the hearing presided over by R. S. Alexander, deputy NRA administrator, April 6, on a code for sheet metal distributors, proposed as supplemental to the general wholesale code. The main problem was to reconcile its provisions as to products covered, commercial practices, and labor rates and hours, with the code proposed by American Steel Warehouse association. Trade jealousies may preclude all coming under a single code preferred by some. Differences not ironed out will be referred to code authorities for each group and to NRA officials. Most differences of opinion were cleared away or compromised at the hearing on the iron and steel warehouse code, April 6.

¶Proposed code for the metal jacketed jug manufacturing industry, a division of the fabricated metal products manufacturing and metal finishing and coating industry, will be heard April 17 by L. S. Horner, deputy NRA administrator. The complete wire and iron fence industry will present its code at the same hearing. Both propose the same hours, wages and labor provisions approved last November for the fabricated metal industry's master code.

¶Deputy Administrator W. A. Janssen will hold a public hearing April 18 in room 2062-64, Department of Commerce building, on the proposed code for the nickel and nickel alloys industry. The code is sponsored by the Nickel Alloys association representing about 90 per cent of the industry. The code would establish a basic work-week of 40 hours with provisions for certain exceptions, and a minimum wage of 40 cents an hour for common labor.

¶Code hearings: Perforating manufacturing industry, April 9; Piping and air-conditioning industry supplemental code, April 12.

Windows of Washington

(*Concluded from Page 15*)

of unemployment insurance in that state. Proponents of this bill regard the 5 per cent rate as a bargaining figure and show willingness to reduce it.

A LARGE market for electric household equipment, including refrigerators, ranges, heaters and water heaters, is in process of creation in the Tennessee valley. It is estimated that there will be approximately 550,000 connected consumers of low-priced government-generated electric current. This apparatus is to be marketed by regular dealers. When they make a sale, they are paid cash in full by Electric Home & Farm Authority Inc., newly incorporated subsidiary of TVA. The latter is reimbursed by means of small additions to the consumer's monthly bill for electricity over a period of four years.

Present planning contemplates the installation of unit heaters, one for each room so that, including ranges, there is an important potential market for resistance wire, fabricated metal, insulating material, etc. Hot water heaters, to be approved, must be of material which adequately will resist the attack of bad water in that district. This planning also embraces the 250 TVA-built houses at Norris, Tenn., later to be increased to 500. A feature of these houses is that all of them are provided with shower stalls made of sheet aluminum.

General Electric Co. already has developed a low-cost, combination, electric refrigerator and cooking range, in response to EHFA's demands. EHFA announces that Kelvinator Sales Corp., Frigidaire Corp. and the Leonard Refrigerator Co. also are at work on an entirely new type of refrigerator which will meet EHFA's stipulation that lower-cost electric appliances, without any sacrifice in quality, must be made available, in order that they may come within the average purchasing ability in the Tennessee valley.

RAILWAY administration officials believe that the issue between stainless steel and aluminum for passenger car construction is now about to be decided.

At the same time that the Union Pacific ordered its 3-car, streamline, aluminum-body train, from the Pullman Co. the Burlington awarded a 3-car, stainless steel, streamline train to the Edward G. Budd Mfg. Co. The latter train now is nearing completion at Philadelphia, so that soon comparative data on the two trains will be obtainable.

Other interesting railroad developments are tendencies to replace chilled cast iron car wheels with rolled steel wheels on new equipment, and to provide hopper cars and gondolas with integrally-cast steel bottoms.

Galvanized hull steel is in increased demand for government vessels. This is noted particularly in connection with requirements for seven coast guard cutters, on which bids were received March 20. The plates and sheets for these boats break down into 1907½ tons black and 3132½ tons galvanized.

Ability to galvanize this material in one dip will be a factor in determining the awards. Hence, concerns with deep galvanizing tanks have an advantage on this sort of business as against those with shallow tanks.

The common, garden variety of steel continues to suffer from competition of corrosion-resistant materials, such as monel metal, stainless steel, and copper and brass. In particular have these materials made progress with the navy department, the army and the government housing divisions.

Where there are bad water or other corrosive conditions, the government all along the line shows a willingness to pay more money for the purchase of corrosion resistance.

BUREAU of construction and repair has authorized a service test of corrosion resistant steel wire rope to determine whether it will be suitable for use as wheel ropes on destroyers. The present type of destroyer wheel rope is galvanized plow steel, ⅜-inch in diameter, and the average life of these ropes is approximately 10 months.

It having been claimed that the quality of corrosion-resistant wire rope has been improved so that this material has strength equal to or greater than the present requirements for galvanized plow steel, and having much higher endurance properties when run over sheaves, the navy will install a 300-foot length of corrosion-resistant wheel rope on one side of a destroyer and new galvanized plow steel on the other side of the same vessel. This will give a direct comparison as to service life of the two types of rope.

MANUFACTURERS of air cooling apparatus are about to receive encouragement from the government to the extent of orders involving an outlay of $700,500, advanced by PWA. Of this, $348,000 will be spent on air-cooling the buildings of the department of agriculture and $110,000 on the Interior building. Smaller amounts will be spent on air-cooling, in part, the State, Internal revenue, Commerce, Old Land Office, Navy, Munitions, and Treasury buildings.

Plans for a seadrome, the first of a chain of transatlantic airports, are dead, at least for the moment, for the sufficient reason that no money has been provided. So are the plans for developing a $700 airplane, and for the same reason.

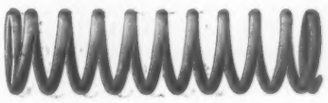
Navy Buys Special Steel

The navy has placed a substantial tonnage of corrosion-resisting steel for delivery at Brooklyn and Mare Island, Calif., covered in openings of Feb. 16. American Rolling Mill Co., at $17,355.64 delivered, took Brooklyn requirements while the Jessop Steel Co., Washington, Pa., at $16,346.64, delivered, booked the Mare Island contract.

These Springs Look Alike, But-

This spring would probably be made from ordinary spring wire by out of date methods—with poorly regulated heat treatment. Lack of broad experience produces ordinary springs—useful fifty years ago but useless in the high grade carefully engineered equipment of today.

This spring may fail before reaching one hundred thousand compressions.



This spring is a Raymond product using carefully selected materials made of proper design by up to date manufacturing methods and controlled heat treatment.

This spring has a long, and useful life of one hundred million or more compressions.—for behind it is the 50 years' experience of

RAYMOND MFG. CO.
Corry, Pa.

Producers of Super Springs

Construction and Enterprise

New England

ESSEX, MASS.—Town board of selectmen, Town Hall, has retained Fay, Spofford & Thorndike, engineers, 44 School street, Boston, to make a survey for a waterworks system, including tank.

GREAT BARRINGTON, MASS.—Bids will be asked soon by Great Barrington fire district commissioners for pumping equipment and accessories. Fay, Spofford & Thorndike, 44 School street, Boston, are engineers.

PAWTUCKET, R. I.—Rhode Island Strip Steel Co., Phillipsdale, R. I., plans a 1-story addition from plans by Monahan & Meikle, 255 Main street, Pawtucket, R. I.

New York

GLOVERSVILLE, N. Y.—City plans construction of a waterworks system costing $265,000, with PWA loan, Morrell Vrooman, Trust building, Gloversville, N. Y., is engineer.

NEW YORK—J. Williams, 542 West Twenty-seventh street, will alter a foundry into a repair shop at 537 West Twenty-sixth street, at cost of over $28,000, with equipment.

NIAGARA FALLS, N. Y.—City plans waterworks improvements with a $400,000 PWA loan. H. W. Clark, Niagara Falls, is engineer.

ROCHESTER, N. Y.—Stewart & Bennett has been awarded contract for construction of a bottling house to cost about $50,000.

ROCHESTER, N. Y.—Gordon & Kaelber, architects, are preparing plans and specifications for a $460,000 school building in the town of Wolcott, Wayne county, N. Y.

SYRACUSE, N. Y.—International Harvester Co., 210 Teall avenue, will build a 1-story addition to its local plant and install electric power equipment, at cost of $100,000.

TONAWANDA, N. Y.—Eastern States Milling Corp., Ontario street and Cloverdale road, will install elevating and conveying equipment, electrically operated, in its proposed 1,000,000-bushel elevator, project to cost about $300,000.

New Jersey

LAKELAND, N. J.—Green & MacNelly Inc., 548 Federal street, Camden, N. J., is completing plans for $350,000 power plant for the Camden county board of chosen freeholders, Fred W. George, clerk, court house, Camden, N. J.

NEWARK, N. J.—V. Leonardis Sons Inc. has been incorporated with capital of $100,000 to deal in steel products, by Charles Leonardis.

SOUTH AMBOY, N. J.—Board of public works plans installation of electric pumping machinery and auxiliary equipment at the municipal waterworks plant, to increase capacity.

Pennsylvania

BLAWNOX, PA.—Blaw-Knox Co. has been awarded contract by the Tennessee valley authority, Knoxville, Tenn., for tanks, bins and conveyors for the Joe Wheeler dam.

BRISTOL, PA.—Rohm & Haas Co., 222 West Washington square, Philadelphia, will build a 3-story addition to its chemical works at Bristol, including electrical power equipment.

BROWNSVILLE, PA.—A. M. Hanauer, care Hamburger Distillery, L. E. Wirth superintendent, plans complete rehabilitation of distillery and installation of new machinery and equipment, to cost $150,000.

CATASAUQUA, PA.—Fuller Co. has been awarded contract for two cement pumps at $10,870 for the Tennessee valley authority, Knoxville, Tenn.

EAST PITTSBURGH, PA.—Westinghouse Electric & Mfg. Co. has received an order for electrical equipment for the Port Peck dam on the Missouri river in Montana. Equipment is for substations to be used in supplying power for the building of the dam. Contract is valued at more than $500,000.

MANAYUNK, PHILADELPHIA — Liebert & Obert Inc., 173 Carson street, is planning extensive alterations to its brewery. Thalheimer & Weitz, 10 South Eighteenth street, Philadelphia, are architects.

PHILADELPHIA—Edward J. Bailey & Son, Sepviva and Duncan streets, has been awarded contract for a machine shop to be erected at Snyder avenue and Swanson street for the Continental Distilling Co.

PHILADEPHIA—Continental Distilling Co., Snyder avenue and Swanson street, has awarded contract to Robbins & Edelman, 1137 North Front street, for 1-story plant, 12 x 21 feet and 28 x 70 feet, and boiler house, 13 x 25 feet.

WIND GAP, PA.—Bolger & Heller Slate Co., J. T. Bolger, president, is taking bids for two 1-story slate mill buildings, 60 x 142 feet and 59 x 54 feet.

Michigan

DETROIT—Motion Picture Engineering Co. has been incorporated to deal in machinery, by Robert Matson, 2332 Clifford street.

DETROIT—Frank De Witt & Co., 5736 Twelfth street, has been incorporated to manufacture building equipment, by Frank De Witt, 2281 West Grand boulevard.

DETROIT—Lincoln Screw Products Co. has been incorporated with $25,000 capital and 1000 shares no par value to manufacture screw machine products, by Maurice Morse, 1417 Penobscot building, Detroit.

DETROIT—Schmidt Brewing Co. has given a contract to the Krieghoff Co., Detroit, for a boilerhouse on Wilkins street. G. A. Mueller is architect.

DETROIT—George Jerome, architect, has completed plans for a water system at Algonac, Mich., to cost about $56,000, for which PWA funds have been allotted.

DETROIT—Henry Martens, 2111 Woodward avenue, has been awarded contract for a 5-story brewhouse on Howard street, for the Mundus Brewing Co., Louis Kamper, 3729 Cass avenue, is architect.

DETROIT—Automotive Sheet Metal Corp., 7575 Eight Mile road, has been incorporated to engage in manufacturing and mercantile business, by Alfred F. Bond, 20494 Santa Barbara drive.

FRANKENMUTH, MICH.—Frankenmuth Brewing Co. will soon complete awarding of contracts for construction of $100,000 brewery here.

PITTSFORD, MICH.—Board of education plans construction of a school building to cost about $70,000.

PLYMOUTH, MICH.—Lee Foundry & Machine Co. will rebuild at once its burned foundry and machine shop at Mill and Ann Arbor streets, at expense of about $70,000.

ST. JOSEPH, MICH.—Upton Machine Co. is taking bids for construction of warehouse building, 90 x 200 feet.

Indiana

ANDERSON, IND.—Lynch Corp. has resumed work on its extensive program of rehabilitation at the former Ames-Baldwin-Wyoming Shovel factory. The main factory building, 200 x 600 feet, is being entirely remodeled and modernized, at a cost of about $30,000, not including new machinery.

CROWN POINT, IND.—City plans construction of a waterworks plant to cost $129,000 and has asked a PWA loan. P. Thomas is city engineer.

EVANSVILLE, IND.—Servel Inc. has a permit for construction of new storage addition.

INDIANAPOLIS—A central steam power station will be included in the 8-story department store addition to be built by William H. Block & Co., 50 North Illinois street, at cost of $1,000,000. Vonnegut, Bohn & Mueller, Indiana Trust building, are architects.

Illinois

CHICAGO—Metallizing Inc., 925 West North avenue, has been incorporated with 500 shares preferred stock and 1250 shares no par value to deal in equipment, machinery and materials for metallizing.

CHICAGO—Clipper Pump Corp., 122 South Michigan avenue, has been incorporated to deal in mechanical equipment and supplies, pressure pumps and allied equipment, by R. W. Hawkins, Frank P. Dereby, and Myron H. Colman. Correspondent:

George A. H. Scott, 1145 South Wabash avenue.

CHICAGO—Michael Tauber & Co., 411-423 South Market street, will sell at public auction April 17 and 18, assets of Zerozone Inc., 939-1011 East Ninety-fifth street, including drills, lathes, milling machines, grinders, compressors and small tools and factory equipment.

CHICAGO—Briskin Mfg. Co., 215-17 South Hoyne avenue, has been incorporated to deal in architectural, ornamental and automobile sheet metal, by Morey M. Briskin, Emma Briskin and Max Briskin. Correspondent: Pines & Stein, Suite 1400, Otis building, 10 South LaSalle street.

CHICAGO—Level Filter Co., 228 North LaSalle street, has been incorporated to manufacture filters, filtration machines and devices of all kinds, by Albert Kercheimer, Jerome B. Levy and Hyman Appel. Correspondent: Philip Appel, Suite 919, 228 North La Salle street.

MATTOON, ILL.—Real estate and equipment of Mattoon Engine Co., 120 North Fourteenth street, will be sold at auction April 12 by Michael Tauber & Co., auctioneers, Chicago. Equipment includes foundry and machine shop, cranes and electrical material.

Alabama

BIRMINGHAM, ALA.—W. M. Smith & Co., Birmingham, dealer in machinery, has bought the machinery at the two blast furnaces of the Sloss-Sheffield Steel & Iron Co. now being dismantled at Sheffield, Ala.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids for machinery as follows: April 10, schedule 2072, two motor-driven engine lathes, delivery Puget Sound, Wash.; schedule 2073, one motor-driven universal cutter head grinder, delivery San Diego, Calif; April 13, schedule 2097, one motor-driven polisher and buffer, delivery San Pedro, Calif.; schedule 2098, one motor-driven toolmakers precision lathe, delivery New York or Philadelphia; schedule 2101, one motor-driven power press, delivery San Diego, Calif.; schedule 2103, one metal bending machine, delivery San Diego, Calif.; schedule 2118, one motor-driven radial drill, delivery Brooklyn, N. Y.; schedule 2116, one motor-driven hack saw, delivery Brooklyn, N. Y.; schedule 2124, two oil-fired boilers, delivery Thorne, Nev.; schedule 2133, two motor-driven electric monorail hoists, delivery New York or Philadelphia; schedule 2146, one motor-driven radial drill press, delivery Washington; schedule 2145, two motor-driven engine lathes, delivery Washington.

Georgia

UNION POINT, GA.—City has been of $38,000 for waterworks system, including filter units and tanks. J. B. McCrary Co., 22 Marietta street building, Atlanta, Ga., is engineer.

Maryland

BALTIMORE—American Oil Co., American building, plans construction of a bulk oil storage and distribution plant in the Curtis bay district, three stories, 100 x 150 feet, including tanks, pumps and accessories, to cost about $50,000.

North Carolina

GREENSBORO, N. C.—Newman Machine Co. has been incorporated by G. F. Newman and M. F. Douglas.

GREENSBORO, N. C. — Lambert Foundry Co. Inc. has been incorporated with capital of $25,000, by A. B. Lambert and J. M. Sykes.

South Carolina

SUMMERTON, S. C.—City, H. C. Carrigan, mayor, has loan of $37,000 for waterworks. Ryan Engineering Co., Columbia, S. C., is engineer.

Tennessee

KNOXVILLE, TENN.—Knox Stove Works Co. plans an addition to its foundry on Ailor avenue, 35 x 100 feet. J. W. Whisman Co. is contractor.

PARSONS, TENN.—City is planning water and sewer system, including pumping equipment, chlorinator, elevated storage plants and distribution system, to cost about $90,000. Freeland, Roberts & Co., Nashville, Tenn., is enfineer.

Virginia

FLOYD, VA.—Town, R. J. Williams, town clerk, is planning waterworks system, to include electric motor and pump, and fire-fighting equipment, at an approximate cost of $32,000. J. B. McCrary Engineering Co., Atlanta, Ga., is engineer.

Missouri

KANSAS CITY, MO.—Hirsch Distilling Co., 401 Delaware street, will enlarge and improve its distillery and install electric power equipment, project to cost $65,000. Mid-West Engineering Co., 3400 Troost avenue, is consulting engineer.

ST. LOUIS—Ramsey Accessories Mfg. Co., J. A. Ramsey president, 3693 Forest Park boulevard, will build a 1-story addition, 75 x 182 feet, General contract has been awarded Atlas Construction Co., 817 North Ninth street.

ST. LOUIS—Adolph Busch Inc., 1109 Title Guarantee building, Adolph Busch, president, recently incorporated, will build a boiler plant in connection with its proposed brewery at Broad-

GOOD USED EQUIPMENT

For

DIE CASTING
FORGING INDUSTRY
MACHINE SHOPS
POWER PLANTS
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STRUCTURAL, BOILER and TANK INDUSTRY

BENDING ROLL—25' 6" NILES-BEMENT-POND Plate, Pyramid Type. Arranged for MD. Top roll 24-7/8" dia. Bottom rolls 18" dia. Capacity 1" plate. Drop end housing.
BRAKE—8' DREIS & KRUMP All Steel Leaf Type. Capacity No. 10 gauge. Arranged for MD.
CRANE—5-T. SHEPARD Overhead Electric Traveling, 52' 4" span. 230 v. DC. Also equipped for Bucket & Magnet operation. 350 feet of Double "A" Frame Runway.
FURNACE—500-lb. MOORE Rapid 'Lectromelt for electric steel melting, 3 phase, with complete electrical equipment including Transformer, 2200 to 120 V. AC.
HAMMERS—(3) 2750-lb. CHAMBERSBURG Model "F" Board Drop.
PRESSES—No. 6-1/2 BLISS Straight Side, Double Crank with spring counterbalance. Belt drive. 54" between housings. 8" stroke.
No. 12 BLISS Straight Side, Double Crank, Double Geared, Single Action. 14" stroke. Bed area 52 x 84". Shaft dia. 12" at bearings; 13" at pins. Arranged for motor drive and motor adjustment. Wgt. 200,000 lbs.
ROLLING MILL—Rolls 24" wide by 12" dia. and equipped with a 22 HP, 220 v. 3 ph. 60 cy. Western Electric Motor with starter and switch box.
SWAGING MACHINES—(2) No. 7 LANGELIER, equipped with Semi-Automatic Hydraulic Feed and Automatic Pneumatic Gripping Jaws. Capacity—tubing 3-1/2", solid hot 3", solid cold 2-1/4". Arranged for motor drive and equipped with direct connected Oil-Gear Hydraulic Pump.
SHEAR—Gate. 62" STAMCO. Capacity 1/2" plate. 18" gap. Driven by a 20 HP, 3 Ph. 60 cy. AC motor. Power actuated hold-down clamp. Modern machine, practically new.
No. 10 BUFFALO for bars and shapes. Capacity up to 3-7/8" rounds and corresponding duty in shapes. Direct connected AC MD with motor.
WHEEL PRESSES—300 and 400-ton CALDWELL Hydraulic, 48" between parallel bars. Direct motor driven with AC motor and Triplex Pump, Jib Crane and Hoist.

In addition to the above, we have available a wide variety of good equipment in various types and sizes.

Manufacturing RITTERBUSH & COMPANY, INC. Equipment
30 CHURCH ST.
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NIAGARA
BRAND
FERRO-ALLOYS

FERRO-SILICON
ALL GRADES
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HIGH CARBON
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Always
DEPENDABLE, UNIFORM,
SUPERIOR

PITTSBURGH METALLURGICAL COMPANY, INCORPORATED
NIAGARA FALLS, NEW YORK

WEIRTON

Producers of Pig Iron; Open Hearth Steel; Billets—Slabs—Sheet Bars—Skelp; Angles, Beams and Channels; Round, Square and Flat Bars; Rails—Steel Plates—Tie Plates—Track Spikes—Splice Bars; Reinforcing Bars; Coke Tin Plate; Kanners Special Cokes—Best Cokes—Charcoals; Lacquered Tinplate; Tin Mill Black Plate (All Finishes); Lacquered Black Plate; Copper Bearing Terne Plate; Hot and Cold Rolled Strip Steel and Strip Steel Sheets; High Finish Sheets; Long Terne Sheets (Common and Special Finishes); Galvanized, Black and Blue Annealed Sheets; Corrugated Sheets, V Crimp Sheets, Roll Roofing; Single Pickled, Full Finished and Auto Body Sheets; Coke—Tar—Benzol—Toluol—Ammonium Sulphate.

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WEIRTON, W. VA.
Division of National Steel Corporation
Sales Offices in All Principal Cities

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LEADERS IN BUILDING AND DESIGNING ELECTRIC AND COMBUSTION FURNACES, KILNS AND OVENS.
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Furnace Engineers & Contractors
Open Hearth, Soaking Pits and heating furnaces
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Boilers • Engines • Pumps
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MURRAY IRON WORKS COMPANY
65th Year of Continuous Operation
BURLINGTON, IOWA

STAINLESS STEEL SHEETS
AUTOMATICALLY POLISHED
ON
EXCELSIOR
STAINLESS STEEL POLISHING MACHINE
35-YEARS POLISHING MACHINE EXPERIENCE
EXCELSIOR TOOL & MACHINE CO.
EAST ST. LOUIS, ILLINOIS.
ESTABLISHED 1892 INCORPORATED 1902

Producer Gas Systems

WE GUARANTEE RESULTS
Using Bituminous and Anthracite Coal, Raw and Scrubbed Gas, for Displacing Oil, City and Natural Gas Coal and Coke in furnaces of all descriptions.
Flinn & Dreffein Co.
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SC&H Furnaces are made for annealing, case hardening, carburizing, forging, cyaniding, lead hardening & oil tempering.

STRONG CARLISLE & HAMMOND
1400 W. 3rd St., Cleveland, O.

SC&H Furnaces are built in all sizes of Oven, Pot, Continuous, and Special Types for Electric, Oil or Gas application.

TUBE MILL MACHINERY
TAYLOR-WILSON MFG. CO.
ENGINEERS — FOUNDERS — MACHINISTS
Main Office and Works: McKees Rocks, Pa.
(PITTSBURGH DISTRICT)

way and Catalan street, including electrical equipment, to cost $400,000. George E. Wells Inc., Security building, is engineer.

ST. LOUIS—Monsanto Chemical Co., 1700 South Second street, will soon begin construction of a 3-story addition, completely air-conditioned and sound proof, to cost about $250,000. Stone & Webster Engineering Co., 33 South Clark street, Chicago, is general contractor. Mauran, Russell & Crowell, Chemical building, St. Louis, are architects.

Oklahoma

CUSHING, OKLA.—Construction of a municipal electric light and power plant has been authorized at a special election, to cost about $280,000, with equipment.

OKLAHOMA CITY, OKLA.—L. & F. Drilling Co. has been incorporated with capital of $10,000, by Lyle L. Brush and F. W. Martin.

PONCA CITY, OKLA.—City has voted $560,000 waterworks bonds. W. Holloway, Tulsa, Okla., is consulting engineer.

Texas

AUSTIN, TEX.—University of Texas Beauford Jester, chairman, Austin, is having plans prepared by Paul P. Cret, Architects' building, Philadelphia, consulting architect, and R. L. White, University of Texas, architect, for completion of 4-story library to cost approximately $1,800,000.

McLEAN, TEX.—Smith Bros. Refining Co., McLean, Tex., plans construction of a carbon black and gasoline plant, including air compressors and operating equipment to handle 75,000,000 cubic feet of gas per day, to cost about $250,000.

PORT ARTHUR, TEX.—Texas Can Co., subsidiary of the Texas Corp., Port Arthur, will build an addition to its can manufacturing plant, to cost about $45,000, including electric power equipment.

Wisconsin

MADISON, WIS.—United States forest products laboratory here will take bids until April 11 for one gasoline engine driven 2-ton traveler crane.

MANITOWOC, WIS.—Clinton Pattern & Foundry Corp. has been incorporated with 110 shares no par value, to manufacture aluminum and brass products, by L. Clinton, C. J. Clinton and associates.

MILWAUKEE—T. L. Smith Co. has received a government order for three 3-yard concrete mixers from TVA for use on the Norris dam project at Knoxville, Tenn.

MILWAUKEE—Allis-Chalmers Mfg. Co. has received releases on contracts placed two years ago by Pennsylvania railroad for transformers and switch engine equipment valued at $1,000,000 for its electrification program.

Minnesota

ELY, MINN.—City will have plans soon for a municipal electric light and power plant to cost about $1,700,000, for which federal aid is being sought. Frederick C. Penn, Columbia building, Duluth, is consulting engineer.

Iowa

MANNING, IOWA—City council plans construction of a municipal electric light and power plant costing $135,000 for which PWA loan has been approved. Burns & McDonnell Engineering Co., 107 Linwood boulevard, Kansas City, Mo., is engineer.

Nebraska

OAK, NEBR.—Southern Nebraska Power & Light Co. plans construction of an electric light and power plant to cost over $80,000.

OMAHA, NEBR.—Eastern Plating Co. Inc. has been incorporated with $10,000 capital to engage in plating and replating of metal, by John C. Renfro, Clarence A. Renfro and Myrtle O. Renfro.

Colorado

FORT MORGAN, COLO.—City Council plans extensions and improvements to the municipal electric light and power plant, including a turbo-generator unit, at total cost of about $75,000. George Cox is superintendent.

Montana

LEWISTOWN, MONT.—Lewistown Brewing Co., Gustave Hodel president, plans to expand and improve its brewery at cost of about $65,000, including installation of electric power equipment, bottling machinery and other equipment.

Pacific Coast

SANTA MONICA, CALIF.—Douglas Aircraft Co., 3000 Ocean Park boulevard, will build an addition, one story, 125 x 300 feet, to cost about $70,000, including electric power equipment, S. B. Barnes, 803 West Third street, Los Angeles, is consulting engineer.

PORTLAND, OREG.—Steel Built House Co. is planning to build steel houses at the plant of the Portland Sheet Metal Works Inc.

PORTLAND, OREG.—General Groceries Co., 2 North First street, will build a 3-story storage and distributing plant, including electric motors, elevators, conveyors and materials handling equipment, total cost $200,000. Sutton, Whitney & Anndahl, Lewis building, Portland, are architects.

RAYMOND, WASH.—County commissioners have applied for RFC loan of $67,000 to finance improvements and extensions planned by the Willapa Valley Water Co.

SEATTLE—Western Blower Co. has been incorporated with capital stock of $128,000 by Graham, Venables & Howe, Henry building.

SEATTLE—Northern Pacific, B. Blum, chief engineer, St. Paul, Minn., plans to spend $50,000 to $100,000 in enlarging its roundhouse and installing a new turntable here.

SEATTLE—Plant of the Commercial Boiler Works, 53 West Lander street, recently was damaged by fire to the extent of $55,000. Some of the equipment will be salvaged and the plant rebuilt.

Dominion of Canada

BRANTFORD, ONT.—Plans are being drawn for a new heating plant and laundry for the Brant Sanitorium in Brantford, Ont., to cost about $80,000.

HAMILTON, ONT.—Steel Co. of Canada will build an addition 80 x 200 feet on Wellington street North for heat treating purposes, to cost $45,000. Hutton & Souter, Hamilton, Ont., are architects.

HAMILTON, ONT.—Burlington Oil Refiners Ltd., 1210 Piggott building, A. Woodburn engineer, will build a cracking plant, including 20 tanks of 200 to 2000 imperial gallons capacity, three heat exchangers, condensers, boilers, pumps, valves and other equipment.

HAMILTON, ONT. — Dominion Foundries & Steel Ltd. has let a contract to Frid Construction Co. Ltd. at $60,000 for an addition at Ottawa street and Beach road. Plans are by Prach & Prach, 1311 Piggott building, and the building will house additional furaces.

SARNIA, ONT.—Goodison Thresher Co., Essex street, J. E. Goodison president and manager, plans a new foundry unit and storage building.

New Trade Publications

CHASERS AND TAPS—Geometric Tool Co., New Haven, Conn., has issued two bulletins, one devoted to its No. 10 chaser grinder and the other to its collapsing taps. Each is illustrated and the devices are well described.

PUMPS — Morris Machine Works, Baldwinsville, N. Y., in bulletin No. 150 describes its double-suction high speed volute pumps. It outlines the special problems involved in design and construction of centrifugal pumps for high speed operation and describes in detail the solution reached by the Morris company.

INDOOR TRANSPORTATION—Saginaw Stamping & Tool Co., Saginaw, Mich., in its 1934 catalog, just issued, covers a wide range of devices for the movement of materials in industrial plants as an aid to economy and convenience. The line includes overhead conveyors, casters, floor trucks, pneumatic tired tractor and truck wheels, gravity conveyor bearings and rollers, troughing idlers and other equipment. It is well illustrated and contains adequate engineering information.

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